A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

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Featuring:

SMALL TOOLS ON CONSTRUCTION

★

Modern Construction Demands Many Small Tools
By J. K. GANNETT
Vice-President, The Austin Co.

★

Safety in Operating Portable Electric Tools
By E. W. MYERS
Engineer, Associated Mutual Liability Insurance Co.

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Power Tools on Housing Project

★

Equipment Repair Bills Reduced with Power Tools

★

Small Tools Aid Contractors on $41,000,000 Pennsylvania Turnpike

★

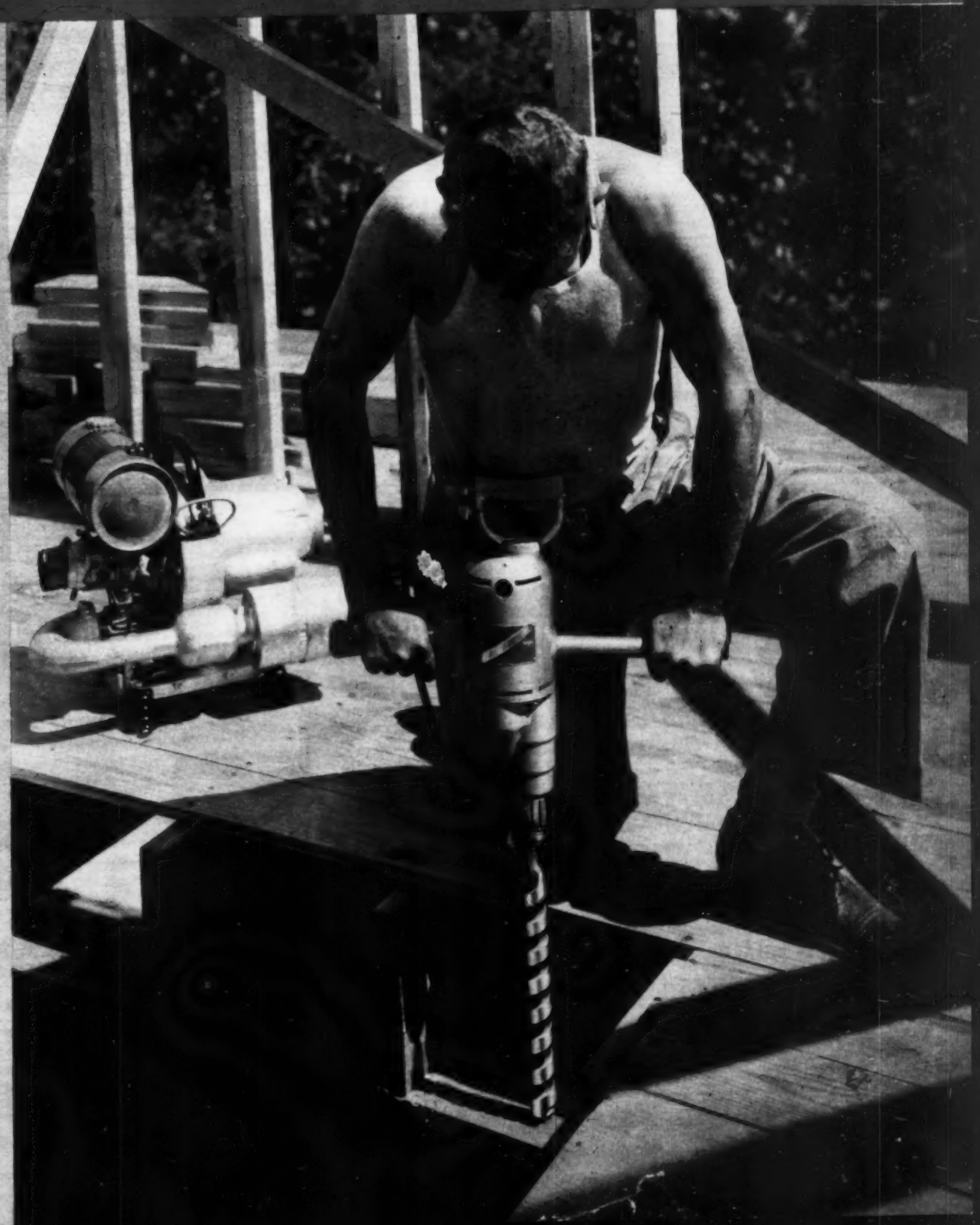
Small Tools on Big Dams

★

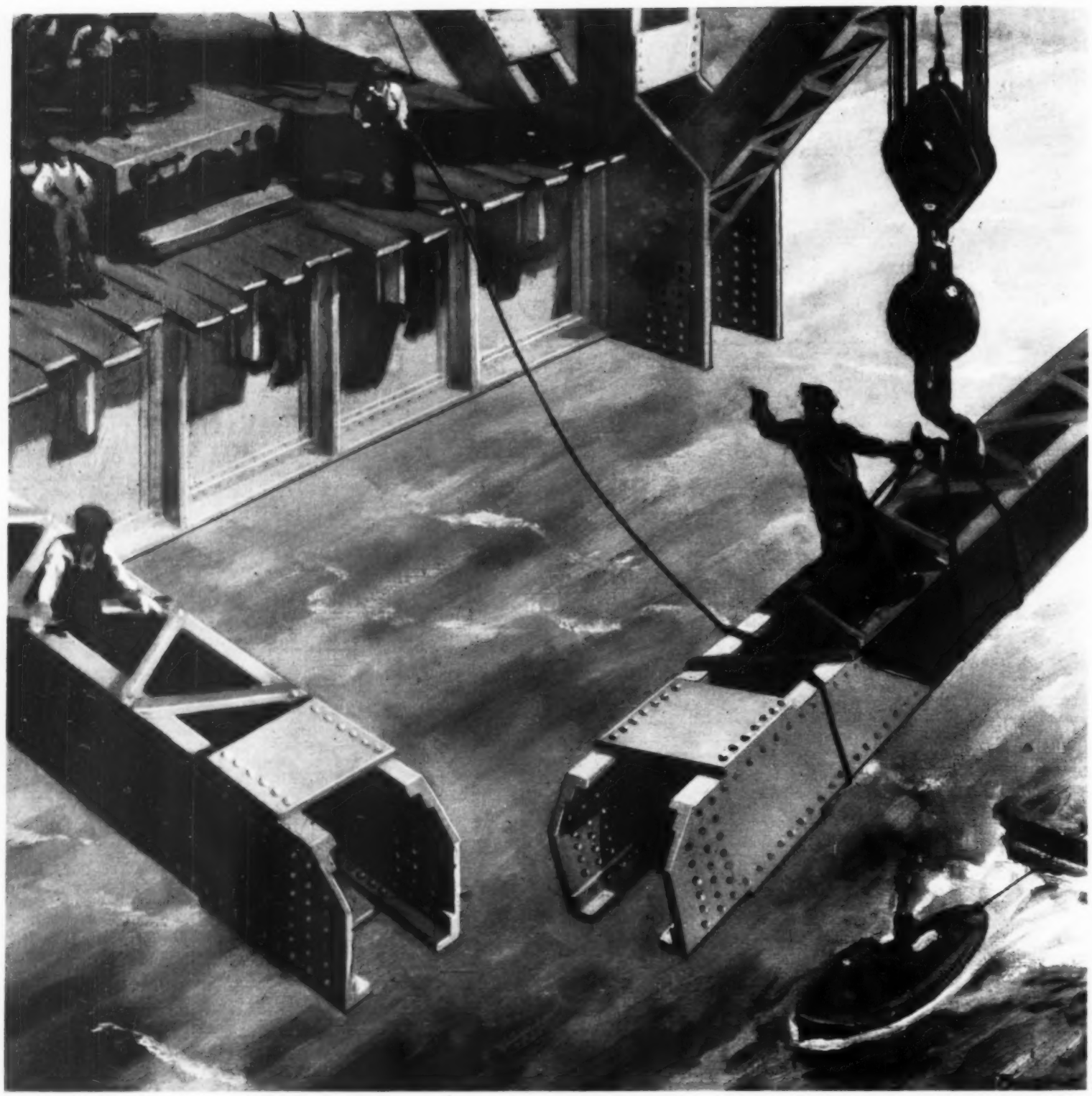
Aqueduct Construction Uses Wide Range of Hand Tools

★

...ures of Pictures Showing On-the-Job Applications of Small Tools



NOVEMBER 1939



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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

TECHNOLOGY DEPT

CURRENT JOBS

.... and Who's Doing Them

HEAVY CONSTRUCTION

Contract for subway in Brooklyn, New York City, was awarded to **Arthur A. Johnson-Necarro Corp.**, of Long Island City, for $2,326,800. In Chicago, low bid of $803,221 for section of new subway was received from **J. C. Tully Co.**, local contractor. Work is starting at Tacoma, Wash., by **General Construction Co.**, of Seattle, on a $1,000,000 ship yard. With its own forces, **Pacific Gas & Electric Co.**, of San Francisco, will build at Marysville, Calif., a $1,420,000 tunnel, 4¾ mi. long. Contract for clearing reservoir site for Grand River dam at Vinita, Okla., was awarded to **D. T. Ross**, of Tyler, Texas, for $223,500. Awards for constructing rural electrification lines in Illinois went to **J. H. Hunzinger & Co.**, of Davenport, Ia., for $276,752, and to **H. G. Johnson**, of Omaha, Neb., for $224,000. Navy hangars at Alameda, Calif., were bid in for $848,155 by **H. Mayson**, of Los Angeles. At Pensacola, Fla., **Virginia Engineering Co.**, of Newport News, Va., will build navy hangars for $327,000.

Channel improvement at Johnstown, Pa., costing $1,314,437 is under way by **E. J. Albrecht Co.**, of Chicago. **Great Lakes Dredge & Dock Co.**, of New York, submitted low bid of $1,153,000 for dredging New York harbor. Two contracts for Pinopolis dikes in South Carolina, went to **C. G. Fuller & J. B. Britton**, of Sumter, S. C., for $844,099, and to **J. A. Tertelling & Sons**, of Boise, Idaho, for $984,098. Dredging contract of $503,391 on Columbia River in Washington, was awarded to **General Construction Co.**, of Seattle. Loyalhanna dam at Saltsburg, Pa., will be constructed by **Great Lakes Dredge & Dock Co.**, for $1,371,710. Builders of the Santee dam in South Carolina will be **McCarthy Improvement Co.**, of Davenport, Ia., under a $3,081,690 contract and **Wilbanks & Pierce, Inc.**, of Greenville, Miss., under a $2,420,265 contract.

SEWERS — WATERWORKS

Low bid amounting to $3,616,650 for substructure of filtration plant at Chicago, was submitted by **Michael Pontarelli & Son**, local contractor. Cast iron pipe line construction in Wichita, Kan., went to **W. B. Carter**, of Wichita, for $233,050, and filtration plant in same city to **Carrothers & Crouch Construction Co.**, of Kansas City, Mo., for $345,050. In Omaha, Neb., **Peter Kiewits Sons Co.** will build a $738,539 sewage treatment plant. Belleville, Ill., has engaged **Hoeflken Bros.**, of Belleville, and **G. Tillman**, of Centralia, Ill., to construct a $479,683 sewage treatment plant. Low bid of $743,403 for sewage plant construction in South St. Paul, Minn., was received from **Okes Construction Co.**, local contractor. Duluth, Minn., will have a new sewage treatment plant to be built for $545,549 by **A. Hedenberg & Co.**, of Duluth.

BUILDINGS

Public — Low bid for mass housing projects in Peoria, Ill., amounting to $3,416,600 was submitted by **Patrick Warren Construction Co.**, of Chicago. **George A. Fuller Co.**, of Washington, D. C., will build a $2,487,000 Silver City housing project in New Orleans, La. In Baltimore, Md., Edgar Allen Poe Homes went to **Consolidated Engineering Co.**, of Baltimore, for $1,102,000. Successful bidder for Jamaica, N. Y., was **H. R. H. Construction Co.**, of New York City, with tender of $1,397,000. At Coco Solo, Canal Zone, **Robert E. McKee**, of El Paso, Tex., will build navy barracks for $1,011,700. Housing projects amounting to $1,777,000 in Huntington, W. Va., were bid in by **Consolidated Engineering Co.**, of Baltimore. **Hinman Bros. Construction Co.**, Somerset, Pa., received $989,500 Terrace Village housing project in Pittsburgh. In Los Angeles, $953,196 was the low bid of **H. A. Nichols**, local contractor, for the Harbor Hills housing project. Successful bidder for Peabody housing project in Columbus, Ga., was **Virginia Engineering Co.**, of Newport News, Va., with price of $913,000. **Goode Construction Corp.**, of Charlotte, N. C., will build Fairview Homes in that city for $928,850. For a post office in Lincoln, Neb., low bid of $494,894 was submitted by **Olson Construction Co.**, local contractor. At price of $614,713 work is being started by **Forcum-James Co.**, of Memphis, Tenn., on Riverview Court apartments in Phenix City, Ala. Housing project in Covington, Ky., went to **Whittenberg Construction Co.**, of Louisville, for $1,170,000.

Commercial — First contract for Thousand Gardens housing project in Los Angeles, Calif., a $7,000,000 undertaking, went to the **Joshua H. Marks-Charde Co.**, of Los Angeles. In Milwaukee, Wis., **C. R. Miller & Sons**, of Decatur, Ill., received $1,423,000 apartment building contract. Hotel and office building will be built in Corpus Christi, Tex., by **McKenzie Construction Co.**, of San Antonio, for $1,103,000. A $1,000,000 hotel in Charlotte, N. C., is under construction by **J. C. Heslep**, of Columbia, S. C.

Industrial — Excavating contract for $7,000,000 cellophane plant at Clinton, Ia., was awarded **A. M. Paulson Co.**, local contractor. At Chester, Pa., **United Engineers & Constructors**, of Philadelphia, will build a $6,500,000 electric generating station. Power plant at Hutsonville, Ill., costing $3,000,000, is under contract to **L. E. Myers Co.**, of Chicago. In East Hartford, Conn., **R. G. Bent Co.**, will build a $1,000,000 aircraft factory. **C. T. Braun & Co.**, of Houston, Tex., have started a $1,000,000 oil refinery in that city.

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Small Tools

ON CONSTRUCTION

This month, as was the case last November, CONSTRUCTION METHODS devotes an entire issue to the general subject of "Small Tools on Construction." In the conduct of large-scale operations in the field heavy-duty mechanical equipment of great size and power has long since been accepted as a necessity if the job is to show a profit under present-day working conditions. With ample evidence available to show how these large machines have been able to save time and cut costs of such major construction operations as earth moving and concrete placement, contractors have begun to realize that similar savings are possible by applying the proper small tools to the smaller, but none the less important, operations that are necessary to produce a finished structure.

The result has been a growing demand for a wide range of small tools to perform such functions as sawing, cutting, jacking, hammering, pushing, pulling, hoisting, vibrating, grinding, polishing, pipe-threading and drilling of small holes. Not so long ago small tools for light duty of the types above noted found their principal applications in industrial production. Today they are expanding their field of usefulness in the construction industry. It is the purpose of this issue to illustrate, in text and photographs the scores of practical small-tool applications which the construction project, whether it be big or little, offers.

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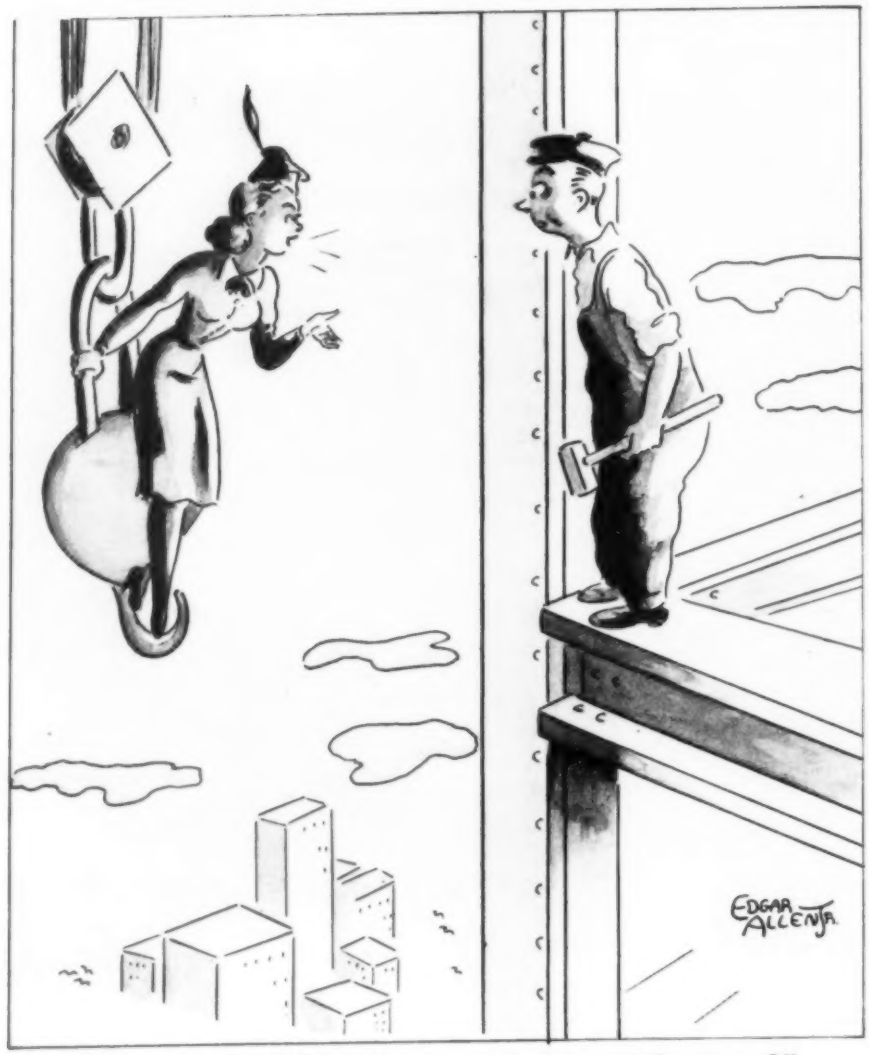
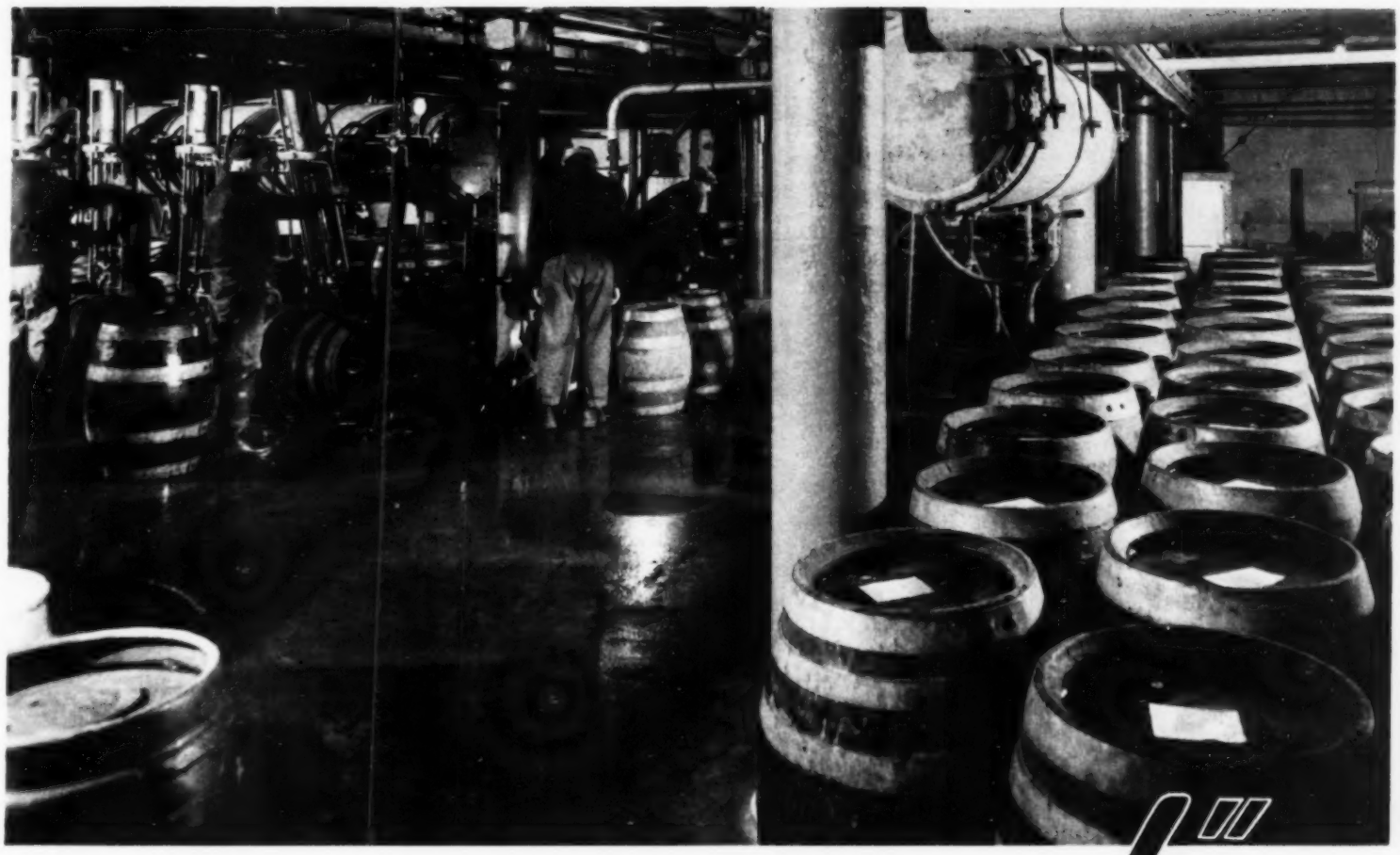
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS



"Are you the feller who was trying to pick me up?"

"Just another break for one of those Princes of Privilege!"



"Here's How!"

'INCOR' BREWERY FLOOR PLACED IN COLD WEATHER; STRONGER, LONGER-WEARING, DUST-PROOF CONCRETE

TEMPERATURES hovered around freezing, when Pilsen Brewing Company's Chicago rack-house floor was replaced last February. Saturday and Sunday, the old floor was torn out. Monday, Armstrong Cork Company placed a 3-in. layer of cork. Tuesday, 2½-in. of 'Incor' concrete (mixing water heated) was placed; followed by ¾-in. 'Incor' monolithic topping.

Floor was finished late Tuesday night. Temperatures inside the rack-house were about 40°, and warm water was used in curing the concrete. Early Friday morning the new floor was in use. Smith, Brubaker & Egan, Engineers and Architects; Kalman Floor Company, Contractor.

Typical of 3-way 'Incor' saving: (1) 'Incor' cures thoroughly in one-fifth the usual time — a big help in assuring stronger, denser, non-dusting concrete; (2) 'Incor' cuts heating costs, protects against freezing; and (3) concrete is ready to use days sooner — no business tie-ups.

Figure these advantages on cold-weather work. You'll find it pays, and pays well, to use 'Incor'* — the 24-hour Portland cement with a 12-year record for long-time, expense-free service. Write for copy of "Cold-Weather Concreting." Lone Star Cement Corporation, Room 2265, 342 Madison Avenue, New York.

* Reg. U. S. Pat. Off.

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E. N. R. April, 1929

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and now ANOTHER for WARREN BROS.
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You may think you know all about Northwests but unless you have had one of these machines you cannot possibly be familiar with *all* its advantages. Remember that every third Northwest sold is a repeat order from a *satisfied* customer. Let us explain Northwest features to you.

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3 EIGHT-YARD EUCLIDS MOVED 93,000 YARDS OF BORROW IN 3½ WEEKS . . . .

Hitting An Average of 245 YARDS PER HOUR

HERE'S performance that speaks louder than words. In 3½ weeks, The S. L. Rardin Sons Co., using three 8-yd. Bottom Dump Euclids, moved a total of 93,000 yards of borrow for a bridge approach fill, 1000 ft. long, at Lorain, Ohio. The fill varies from 0′ to 40′ in height, the grade of the ramp being 4%. These Euclids were loaded with a 1½-yd. shovel and double shifted at 16 hours a day for 3½ weeks. During this period a 245 yards-per-hour average was maintained. Teamwork was the answer for profitable speed on this job. The S. L. Rardin Sons Co. has built up its fleet of Euclids since 1936 . . . adding one each year. Today, these three Euclids, of varying ages, are delivering full-time, full-profit performance. Your fleet can be built up the same way. Why not find out what Euclids can do for you?

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American Chain development and manufacturing resources provide industrial and hardware chain for every need. Chain for a Pekinese or a Missouri mule—to open a window or hold a battle ship at anchor—to prevent motor car skids or hoist a 200-ton locomotive into an outbound freighter.

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In our chain-making shops and factories no method is sacred because it is old; no suggestion for improving quality is turned down because it is new. We test and try, experiment and analyze, day after day, year after year. As a result, we feel safe in offering to submit recommendations for any problems involving chain.

In busy times as much as 400 miles of chain per day are produced in our plants.

Packed in new barrels and boxes, attractive cartons and cotton bags, American chains are easy to handle, easy to identify.

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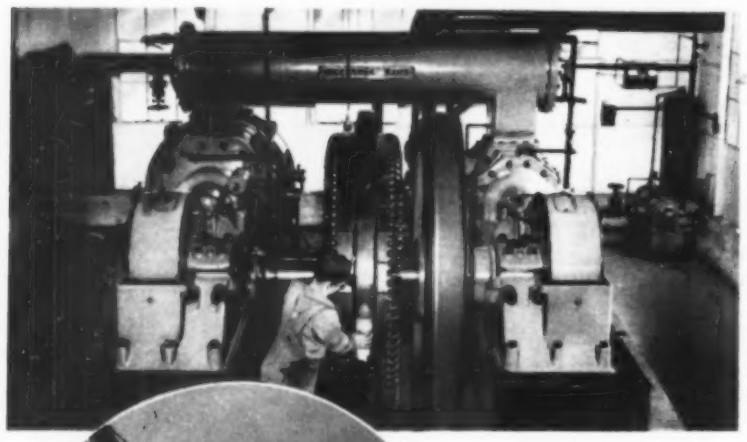
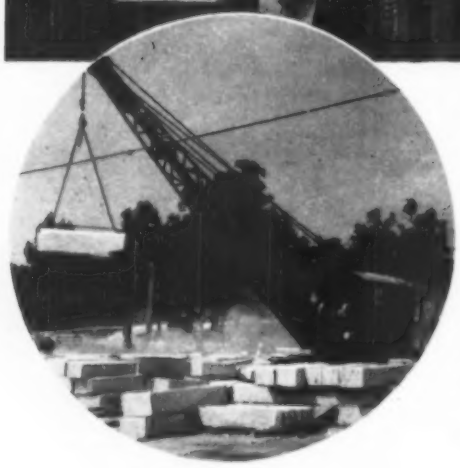
FEWER INSPECTIONS REQUIRED

GENERAL VIEW of North Carolina Granite Corporation s quarry at Mt. Airy. The quarry, approximately 75 acres in extent, with 3 cutting plants, furnishes stone for schools, churches and other structures, including the $15,000,000 Arlington Memorial Bridge. All equipment from drills to compressors, saws, and locomotive cranes is kept at top condition with Texaco Lubricants.



TWO-STAGE Ingersoll-Rand 500 h.p. compressor. The cylinders are lubricated with Texaco Ursa Oil, have been for years.



LOCOMOTIVE CRANES on North Carolina Granite's property. Texaco Crater Compound is making an enviable record giving longer life, better protection to all wire rope and gears about this quarry.

THEY'RE keeping compressors working longer hours with less time out for inspection and cleaning, at the North Carolina Granite Corporation's quarry, Mt. Airy, N. C.

In spite of this hard service, valves and ports stay free from carbon accumulations, and continue to seat properly. For more than 7 years, these compressors have been lubricated exclusively with Texaco Ursa Oil. In fact, all equipment here is Texaco lubricated 100%.

You can get similar operating efficiencies by using Texaco Alcaid, Algol, or Ursa Oils.

Experienced lubrication engineers, trained in the selection and application of Texaco Compressor Lubricants, will be glad to demonstrate that savings can be made with Texaco Perfected Lubrication.

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Wipe out those time losses, big maintenance bills, and high production costs. These machines are specially designed and built to utilize Maximum Speed — Maximum Power — Maximum Flexibility. And that is where you save time, money and trouble on all types of jobs.

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When you use J & L Precisionbilt Gilmore Wire Rope you get economical operation and, at the same time, safeguard the lives of those who rely upon its strength and durability. Write today for our catalog of Precisionbilt ropes for the construction industry.

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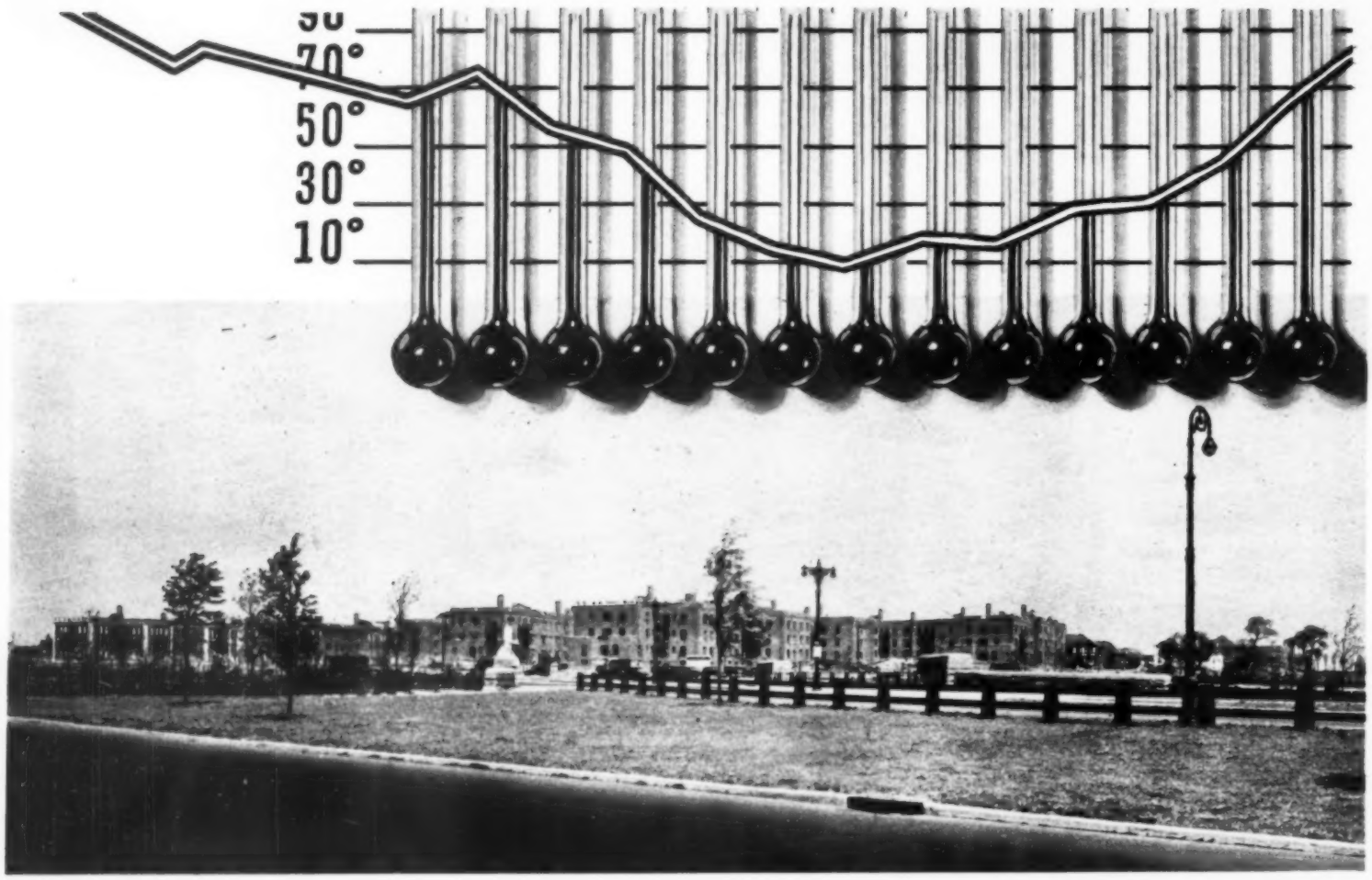

GARDEN BAY MANOR,
Jackson Heights, Queens, New York City
GENERAL CONTRACTOR:
Airport Land Corporation, Inc., New York City
CONCRETE SUB-CONTRACTOR FOR SECTION C:
Joseph Mascioli and Son, Jamaica, N. Y.
ARCHITECT:
B. Robert Swartburg, New York City

LEHIGH
EARLY STRENGTH
CEMENT

BEFORE SPRING CAME *there were Anxious Moments*

Have you a job to finish up before cold weather sets in? Have you a job you want to keep busy on all winter? If so, profit by the experience of Joseph Mascioli, concrete contractor for the apartment houses illustrated.

Delayed construction foretold inconvenienced tenants, loss to owners, expense to the contractor. Cold weather added to the emergency. Joseph Mascioli tells how he finished the job on time with Lehigh Early Strength Cement:

> ***"I stripped forms the next day and re-used them. This was very convenient and economical. Most important, it made up lost time, much to the owner's satisfaction, because this was a leasing proposition with tenants moving in at specified times. Our work faced Flushing Bay, where temperatures often dropped much below freezing. Thanks to Lehigh Early Strength Cement we overcame this obstacle."***

Use Lehigh Early Strength Cement to get advantages like Mr. Mascioli's. It makes better denser concrete in one-third to one-fifth the usual time. When a cold spell threatens, this quick curing lessens the danger of damage by frost. And in severe weather, when heat protection is required, the short curing period reduces its cost. With Lehigh Early Strength Cement form costs will be minimum. It will help co-ordinate your construction schedule. Winter or summer, it will save you time and money.

For special data on Concrete in Cold Weather, ask the Lehigh Service Department

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Allentown, Pa. Chicago, Ill. Spokane, Wash.

there's an EXTRA BONUS in it

For you

ON THE BIG JOBS

On Pennsylvania's 21,000,000-yard Turnpike it's *again* LeTourneau more than 3 to 1 over all other tractor tools combined. Here, one of C. J. Langenfelter's three Model "RU" 30-yard Carryalls is pusher heaped to the springpipe with 22 *pay yards* of shale, to take fullest advantage of available loading horsepower . . . to stretch scraper savings over long hauls at shorter haul yardage costs.

. . . with Carryalls® of twice the capacity

"Something-for-nothing" offers never convinced anyone. With today's LeTourneau extra-capacity Carryalls getting as much as 100% extra yardage *for the same fixed hourly operating cost for booster tractor horsepower*, can you afford to own and operate any other scraper as a *gift*? We'll leave it up to you . . . make this comparison:

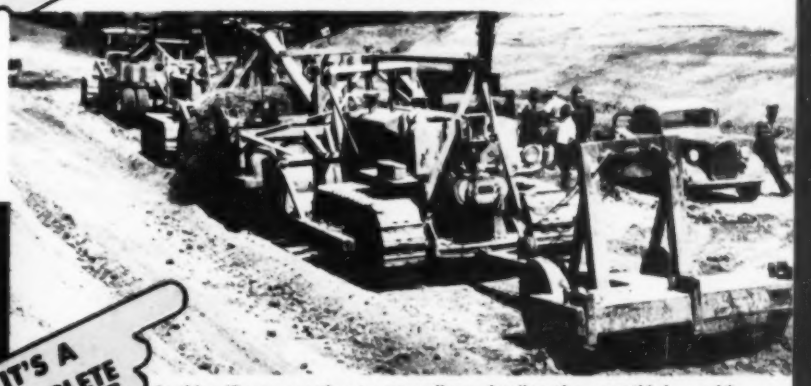
ON AN 800-FOOT ONE-WAY HAUL

	A D8 and 14-yd. scraper with D8 pushing	*A D8 and Model "RU" Carryall (30 heaped yards) with D8 pushing*
Will load	11 pay yds.	22 pay yds.
In average time of	.70 minutes	1.5 minutes
Will dump in average of	0.50 "	0.7 "
Will make 2 turns in average of	0.50 "	0.5 "
Will travel to dump and return to fill in average of	4.25 "	4.25 "
Make the complete cycle in average of	5.95 "	6.95 "
Will deliver in a 50-min. hour on average of	92 pay yds.	158 pay yds.

The profits are exclusive with Le Tourneau for Carryalls are engineered to give bigger pay loads than average scrapers . . . from the ground up . . . for more pay yard capacity, for no other units offer every cost-cutting feature for Carryall operating ease: self-sharpening blades, set at a plow-like angle, penetrate naturally, thus cut power demand . . . more strength per pound produced by patented box-beam, alloy steel construction — "floated" on broad tread, large-diameter tires . . . positive ejector tailgate that polishes the bowl clean every *time*. These are but a *few* of the natural LeTourneau Carryall advantages your LeTourneau and "Caterpillar" dealer will demonstrate *on your job!* Ask him. R. G. LeTOURNEAU, INC., Peoria, Ill., Stockton, Calif.

ON THE 'AVERAGE' JOBS

Grading a state highway near Sparta, Wis. (above). After a "taste" of the 17 *pay yards* of blow sand this LeTourneau Model "W" Carryall could load . . . it didn't take Heffman Construction Company long to put two such units into permanent operation on their work. A standard LeTourneau 'Dozer finds time between scraper boosting for odd jobs.

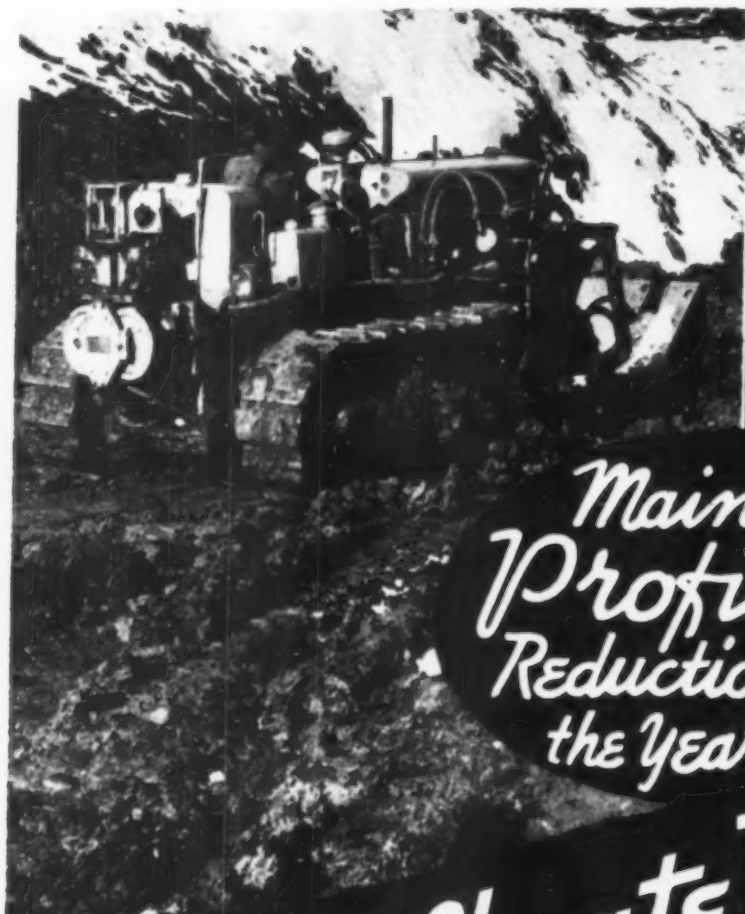


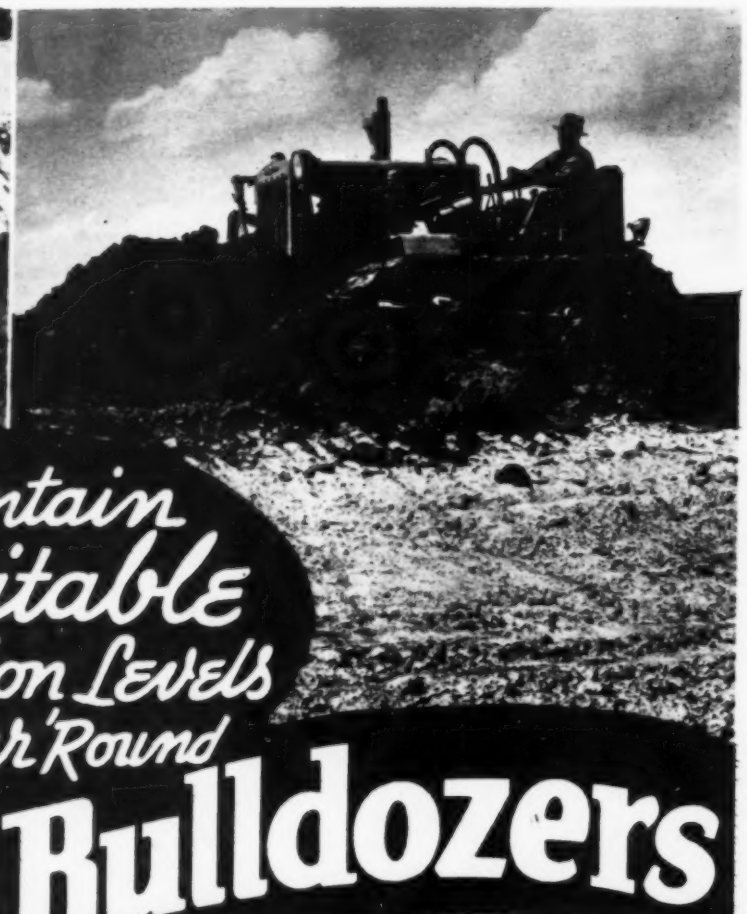
IT'S A COMPLETE PACKAGE

Combine 'Dozer boosting to cut ordinary loading time *one-third* . . . with Rooter fragmentation in material heretofore considered strictly truck and shovel work . . . and you're equipped to extend those Carryall Scraper savings over a 30% greater variety of materials.

LETOURNEAU

ROOTERS® 'DOZERS CARRYALLS®

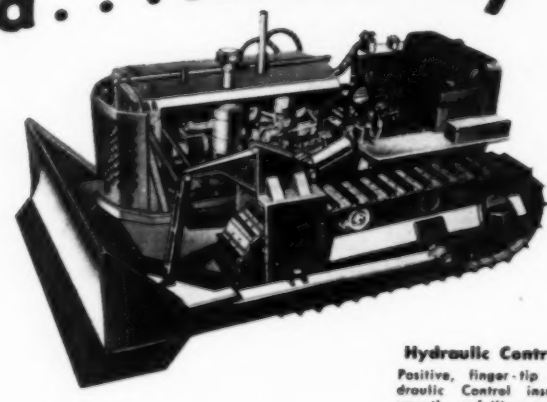




Maintain Profitable Reduction Levels the Year 'Round

La Plant-Choate Bulldozers

Power . . . . Stamina . . . Versatility

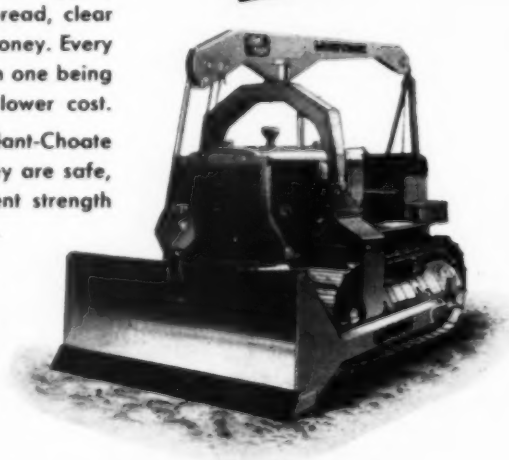


TODAY'S JOBS call for speed plus low working costs — in good weather or bad. And in their dependable, economical Bulldozers, LaPlant-Choate give you the help you need to meet these requirements.

There is extra efficiency and added profits for you in this rugged, versatile tool. LaPlant-Choate Bulldozers dig, level, fill, spread, clear land and do a host of other jobs that save you time and money. Every unit incorporates 17 advanced engineering features — each one being essential to performing some task better, faster and at lower cost.

Hundreds of users throughout the world have found LaPlant-Choate Bulldozers the perfect unit to balance their equipment. They are safe, easy-to-operate, mechanically simple and have the inherent strength to give longer service even under the toughest conditions.

LaPlant-Choate Bulldozers are designed and built exclusively for use on "Caterpillar" Track-type tractors. This insures full utilization of power with new freedom from breakdowns and costly delays. The Bulldozer mounting can be quickly and easily removed to free your tractor for other work. Get full details from your nearest LaPlant-Choate and "Caterpillar" dealer. Write today for Free catalogs.



Hydraulic Control

Positive, finger-tip Hydraulic Control insures smooth, unfailing power for exerting down pressure for digging . . . locking the blade in any desired position . . . efficient lifting speeds. A universal favorite.

"Caterpillar" Cable Control Unit

Here is a cable control unit that sets a new standard for quality, performance and economy. Genuine "Caterpillar" Cable Control Unit. Does many jobs efficiently and dependably. Whatever your Bulldozer needs may be, LaPlant-Choate gives you greater value.

BULLDOZERS • SNOW PLOWS
RUBBER WHEELED WAGONS
CARRIMOR SCRAPERS

TRAIL BUILDERS
BRUSH CUTTERS
TAMPING ROLLERS

LA PLANT-CHOATE MANUFACTURING CO. Inc.

CEDAR RAPIDS, IOWA.

New TAD

LORAIN 80

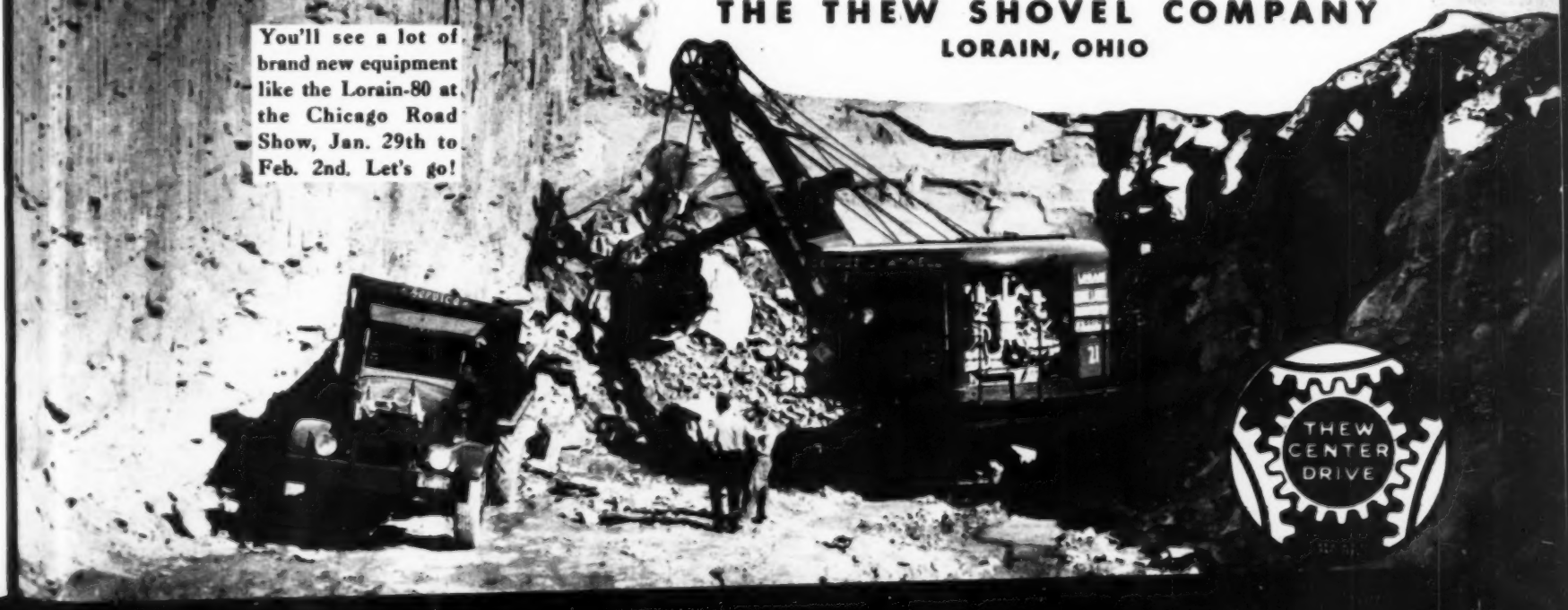
• Test first and talk later was the policy back of the Lorain-80's development. So, without any fanfare or ballyhoo, Lorain-80's went to work in 13 states on such jobs as the Virginia Skyline and the Pennsylvania Turnpike. Over a period of months—not weeks—these machines have had their teeth in every kind of digging—been subjected to every known test their owners could think of to prove their power, speed and strength.

What's the verdict? Just ask the owners of these Lorain-80's. They've got figures and facts galore that bear out our original hunch —Lorain has again produced a "winner."

Write for list of these owners and copy of catalog describing the new features of the 1¾-yd. Lorain-80.

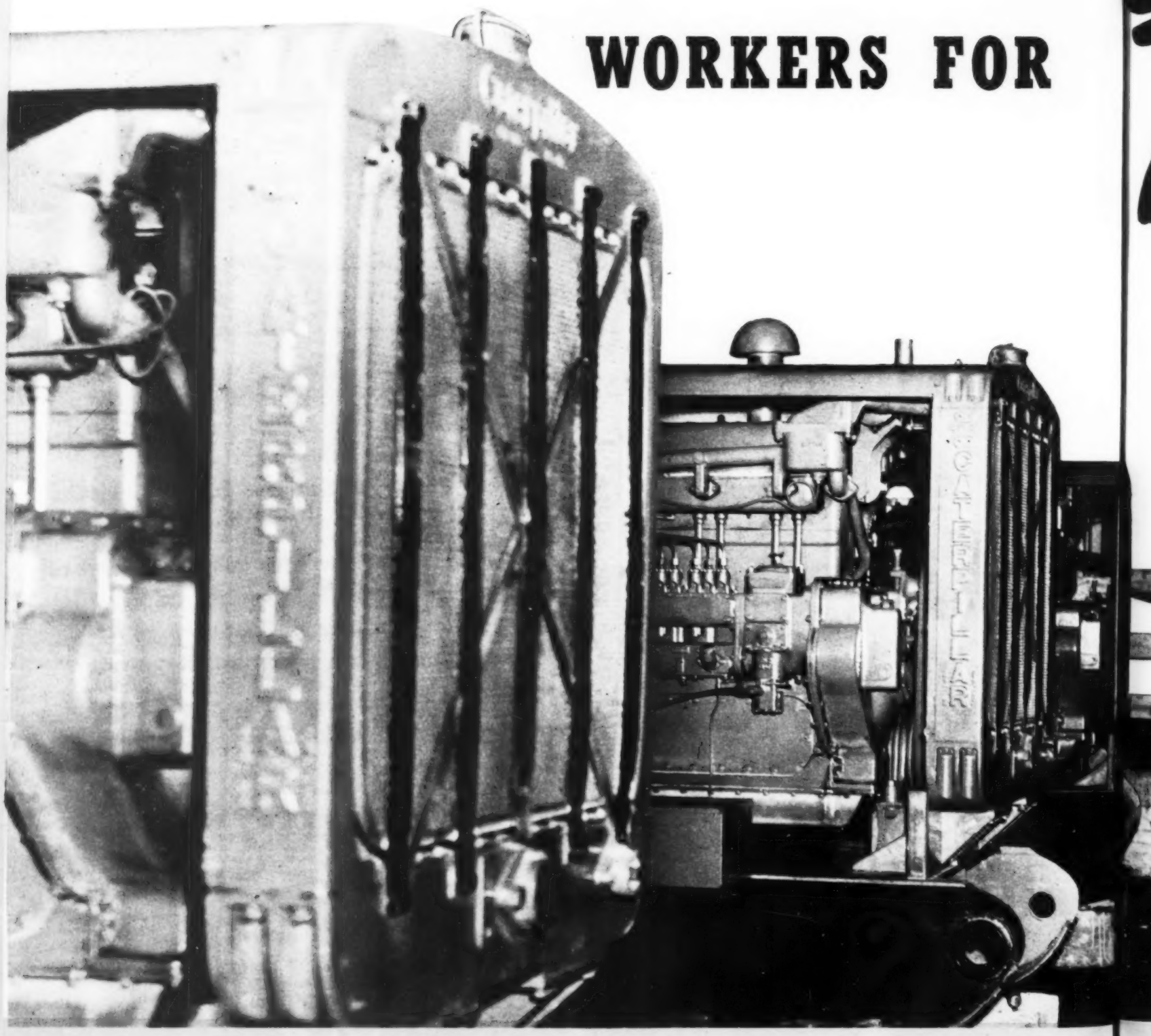
THE THEW SHOVEL COMPANY
LORAIN, OHIO

You'll see a lot of brand new equipment like the Lorain-80 at the Chicago Road Show, Jan. 29th to Feb. 2nd. Let's go!



WATCHDOGS FOR

WORKERS FOR



CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES • TRACK-TYPE TRACTORS

SAFETY PROFIT

THE contractor with an eye on reputation as well as profits leaves nothing to chance. . . . He guards against mishaps, high operating costs, time losses, penalties—in all of which *power* is a mighty important factor.

On this sewer-construction project for the city of Decatur, Illinois, "Caterpillar" Diesel Power is used—because of its decisive *economy* and particularly because of its *proved dependability!*

Four D13000 "Caterpillar" Diesel Engines guard human life and health and keep this underground job moving along.

No. 1 engine, in foreground, powers a 6 x 7 Sullivan compressor supplying air (100 lbs.) for 12 drills.

No. 2 engine operates continually on either high or low (15 lbs.) pressure, but serves mainly as a stand-by to relieve engine on either side of it when shut down for lubrication or inspection; also to take up added load when concrete is being poured.

No. 3 engine operates a 10 x 10 Sullivan compressor supplying air under low pressure (3 to 15 lbs.) for bulkhead needs—holding back sand and water while "muckers" excavate and load.

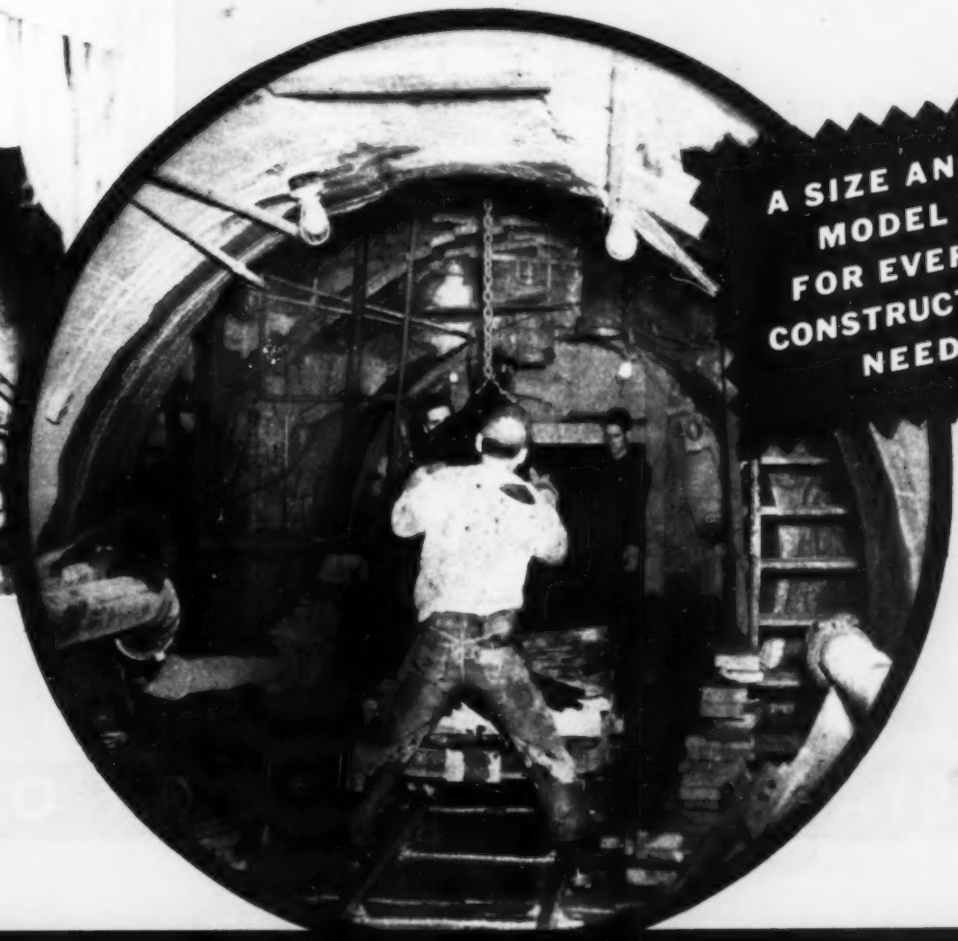
No. 4 engine operates a 17 x 10 Chicago Pneumatic compressor which also supplies bulkhead pressure.

The "flexibility" of these engines makes it easy to regulate pressures to meet varying conditions.

Contractors: Birt Bros. and File & Collins Construction Co.

Not only are "Caterpillar" Diesel Engines, with their sturdy build, capable of filling the power needs of a variety of equipment and uses, but of readily adapting themselves to light or heavy loads without fuel waste. What's more, they can keep going on 24-hour schedule day after day—requiring little attention beyond refueling and oil-changing. Maintenance costs under ordinary care are relatively low; adjustments few and simple. And when, eventually, service or replacement parts are needed, the most complete, efficient and widespread facilities of any engine in the world are readily available.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



A SIZE AND MODEL FOR EVERY CONSTRUCTION NEED

L A R

OAD MACHINERY

New "RPM" DELO

(Diesel Engine Lubricating Oil)

GIVES YOU MORE "DIESEL PER DOLLAR!"

Smoother break-ins. *Longer* peak power performance. *Cleaner* engines. Definitely *lower* wear-rate. *Rock-bottom* operating costs. These are what you want —and exactly WHAT YOU GET with New "RPM" DELO!

Let's look at the record at the end of these tests:—All pistons, rings and skirts in *excellent* condition; oil filters *unclogged;* bearings mirror-smooth, clean, and—*no* sign of corrosion.

Long tests—full-load tests—grueling tests in your own Diesels will confirm this experience of 99,000 hours of testing. New "RPM" DELO's unequaled lubrication will give you *more trouble-free Diesel performance for your money.* Try it —and see.

New "RPM" Diesel Engine Lubricating Oil now available everywhere in the gray barrel with the blue head

Unequaled **for every Diesel**

Order from Your Nearest Distributor as Listed Below:

IN THE UNITED STATES

"RPM" Diesel Engine Lubricating Oil:

The California Company (Montana only)
Humble Oil & Refining Company
Standard Oil Company (Indiana)
Standard Oil Company (Nebraska)
Standard Oil Company of California
Standard Oil Company of Texas
Utah Oil Refining Company

Dial "RPM" Diesel Engine Lubricating Oil:

The Carter Oil Company, Tulsa, Oklahoma
Colonial Beacon Oil Company
Standard Oil Company of Louisiana
Standard Oil Company of New Jersey
Standard Oil Company of Pennsylvania

Kyso "RPM" Diesel Engine Lubricating Oil:

Standard Oil Company (Inc. in Kentucky)

Signal "RPM" Diesel Engine Lubricating Oil:

Signal Oil Company

Sohio "RPM" Diesel Engine Lubricating Oil:

The Standard Oil Company (Ohio)

IN CANADA AND NEWFOUNDLAND

New Imperial "RPM" Diesel Engine Lubricating Oil:

Imperial Oil Limited

IN BRITISH COLUMBIA, ALBERTA AND SASKATCHEWAN

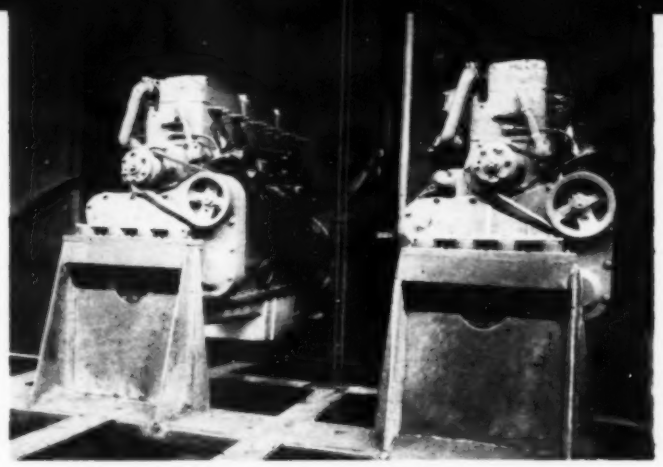
New "RPM" Diesel Engine Lubricating Oil:

Standard Oil Company of British Columbia Limited

THROUGHOUT THE WORLD

"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries. Get in touch with your nearest distributor.

STANDARD OIL COMPANY OF CALIFORNIA



★ The Snow Cruiser—a moving research base, has to provide housing—light—warmth—food and transportation for a crew of four scientists for long periods without outside contact. The power plant had to have a record for dependability established through thousands of similar units already in operation. The engines must be instant starting, readily adaptable to frigid climates—smooth and flexible—simple and easy to maintain and service. One engine met all the specifications—the Cummins Dependable Diesel. Send for complete details. Cummins Engine Company, SC16 Wilson St., Columbus, Indiana.

SNOW CRUISER

ANTARCTIC EXPEDITION • RESEARCH FOUNDATION OF ARMOUR INSTITUTE OF TECHNOLOGY • PROJECT No. 1-69

Powered by two 150 H.P.

No Parlor Floor for KOEHRING DRAGLINES

Dragline work on drainage jobs is not done on a "parlor floor". Koehring Dragline crawlers provide stability, have low ground pressure, are controlled from the cab, travel and turn easily, under water, in mud, sand, gravel and under other unfavorable ground conditions. Koehring crawlers need no prepared roadway. Driving tumblers are self-cleaning, without mud traps. Crawler girders protect the rollers. Smooth crawler shoes remain clean. Multiple hinged shoes provide strength across full width connection. Koehring Dragline owners know that their machine can travel where the work is to be done.

KOEHRING COMPANY
MILWAUKEE • WISCONSIN

Big, heavy, heaping loads are easily handled because of stability, low ground pressure, wide crawlers of Koehring Draglines.

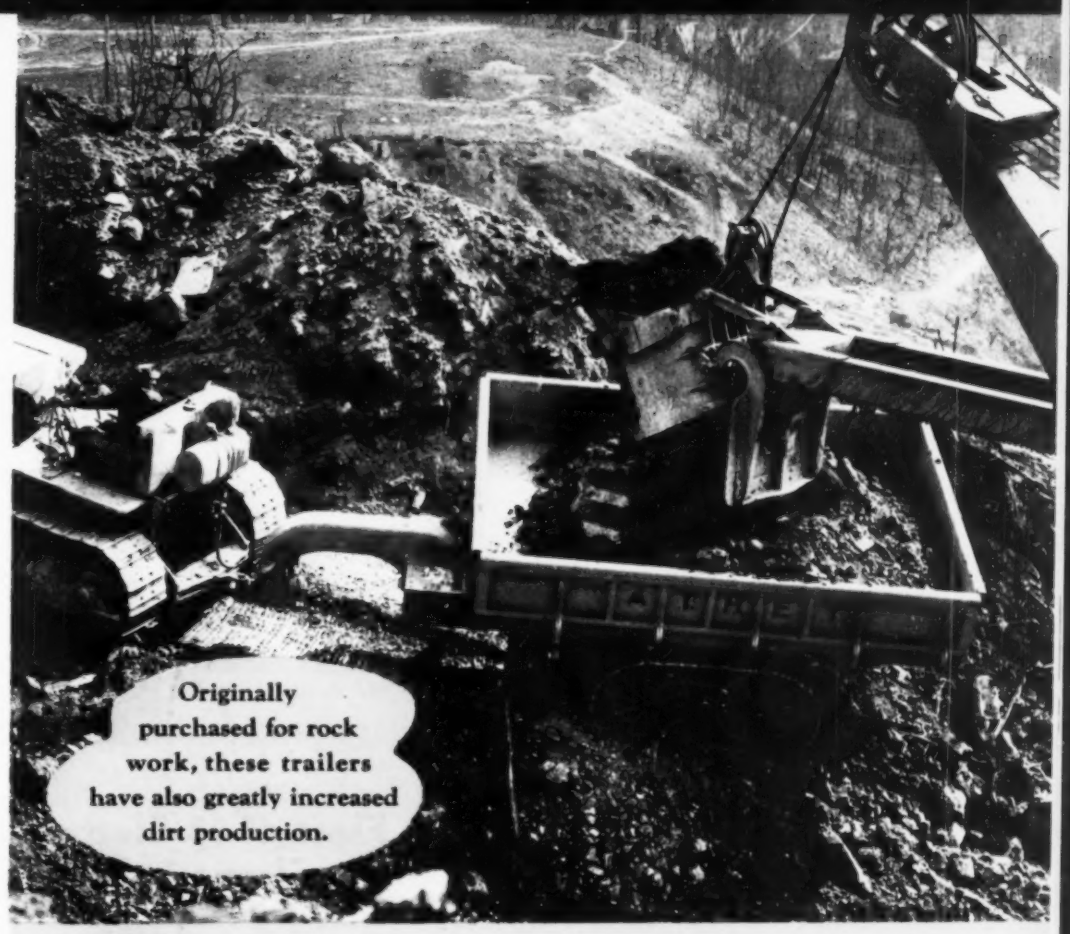
HEAVY-DUTY CONSTRUCTION EQUIPMENT

KOEHRING HEAVY DUTY

MOTORIZED
For transportation on smooth roadway —where rubber tires find the going easy— the U. S. army motorizes for speed.
MECHANIZED
But for the actual fighting—away from the pavement where the going is tough— the army mechanizes with tanks and armored cars.

70 YARDS MORE ROCK PER HOUR

FROM 2-YARD SHOVEL WHEN HARRISON CONSTRUCTION CO. *MECHANIZES* HAULING ON THE PITTSBURGH HOUSING PROJECT



MECHANIZED WITH ATHEY FORGED-TRAK TRAILERS FOR MAXIMUM SHOVEL OUTPUT

A two yard shovel loading four 16 yd. Athey Forged-Trak 2-Way Dump Trailers pulled by "Caterpillar" D8 tractors produced on an average of *70 yards more rock per hour* than when loading trucks.

These hauling units—running over their own "steel highway"—permitted maximum shovel production because they were always able to get up close to the shovel—on top of spill—up the side of the excavation or on top of material that sloughed away from the face of cut.

They did not need a cleared, smooth place on which to maneuver and back in under the shovel.

They were loaded on either side of the shovel —no waiting for one unit to pull out so another could back in.

They did not need to be "nursed" with partial loads or easy loading.

MECHANIZED TO ELIMINATE THE COST OF MAINTAINING ROADWAYS

Athey Forged-Trak Trailers and "Caterpillar" Diesel Tractors furnished their own roadways over rock, slippery clay and mud. Their broad tracks kept the fill in excellent condition.

MECHANIZED TO INSURE UNINTERRUPTED HAULING CYCLE

These hauling units prevented "pile ups" of hauling equipment stopped by mud, rock or slippery going—prevented "partial loads." Athey 2-Way Dump Trailers discharge their loads over the very edge of the fill without maneuvering or stopping. Their broad, flat tracks provide a steel highway over which heavy loads are carried constantly and profitably regardless of bad going. For maximum production it pays to mechanize with Athey Forged-Trak equipment. See your "Caterpillar" dealer or write—

ATHEY TRUSS WHEEL CO.
5631 W. 65th ST., CHICAGO, ILL.
CABLE ADDRESS: "TRUSSWHEEL" CHICAGO

BE MODERN . . MECHANIZE YOUR JOBS WITH ATHEY FORGED-TRAK TRAILERS PULLED BY "CATERPILLAR" DIESEL TRACTORS

ATHEY

FORGED-TRAK WAGONS AND TRAILERS

MECHANIZE TO KEEP THE SHOVEL SWINGING

"NO TIME OUT with Gulfpride Oil"

says field supervisor on Pennsylvania Turnpike job

Jacobson and McKinley, with their large fleet of Diesel tractors, are doing the scraper work for Connell and Laub on their three Pennsylvania Turnpike jobs, as well as for Herman Holmes on the job which he is doing on this same project. Gulf oils, greases and fuel are being used.

"We Keep this Fleet of 18 Cletrac Diesels on the Job Continuously—using GULF'S HIGHER QUALITY LUBRICANTS and FUEL"

"WE keep this fleet of Diesel tractors on a tough working schedule," says the field supervisor on this job, "so we use the highest quality oil we can get —Gulfpride. And we have avoided ring sticking or other engine troubles which cost time and money. It pays us to follow the Gulf engineer's recommendations for all our equipment."

Gulfpride Oil provides an *extra margin of operating safety* for your equipment. Here is the reason: Gulfpride is made by Gulf's exclusive Alchlor process, a modern method of refining which only Gulf can use. This special treatment gives Gulfpride stability and lasting qualities that far exceed any motor oil of which we have record.

Gulf's higher quality lubricants and fuels are quickly available to you no matter where your job is located. They are distributed through more than 1100 warehouses from Maine to Texas. Ask the Gulf engineer to recommend the oils and greases which will give you the most economical, trouble-free service . . . Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

ALSO A COMPLETE LINE OF FUEL AND FURNACE OILS

NO SHOULDER WEAR WHEN THE SHEAVES ARE IN LINE

Proper alignment allows the rope to leave the sheave without dragging over sheave shoulders. Even the slightest misalignment accelerates wire rope wear to a surprising degree and materially shortens the life of the rope. There are easy methods of checking sheave alignment under various conditions. Send us a rough diagram of your sheave arrangement and we will gladly tell you how to check their alignment. It will help you to get longer rope life.

WICKWIRE ROPE

WICKWIRE SPENCER STEEL COMPANY

General Offices: 500 Fifth Avenue, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

Another "ATLAS FIRST"

ATLAS MANASITE DETONATORS Have Been Accepted

The figures tell the story—over 50,000,000 Atlas Manasite Detonators already have been sold. The reason? Atlas Manasite Detonators make safety precautions more effective by lessening the possibility of accidents from inadvertent mishandling.

Atlas Manasite Detonators offer materially decreased sensitivity to impact and friction—with no loss in detonating efficiency and no increase in price.

Are you using this advance in promoting greater safety?

Safety is ALWAYS the first consideration

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Houghton, Mich.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Joplin, Mo.	New York, N. Y.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Chicago, Ill.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.
Denver, Colo.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS

EXPLOSIVES

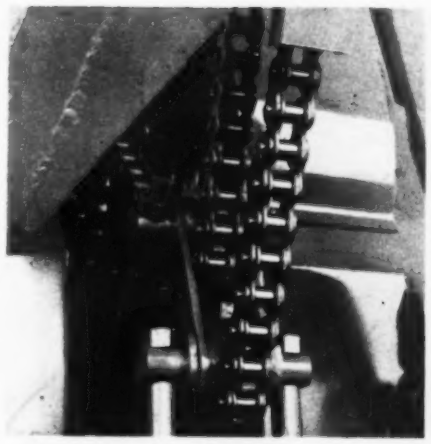
CHEMICALS ATLAS EXPLOSIVES

POWER *To Dig*

When frost strikes deep into the ground you want to know that your shovel can "take it"—that it has *POWER to dig*—that it will maintain high yardage without stalling. *POWER to dig* in all BAY CITY machines results from high powered, low engine speeds that give you greater lugging ability. The basic design of the BAY CITY with helical gears, anti-friction bearings, one-piece chain crowd, sturdy shipper shaft, 3 part hoist line and bucket with cast front and back insures maximum power—maximum yardage at lower cost. A few of the outstanding design advantages are shown here. Look them over, then write for illustrated 32 page Catalog H-2.

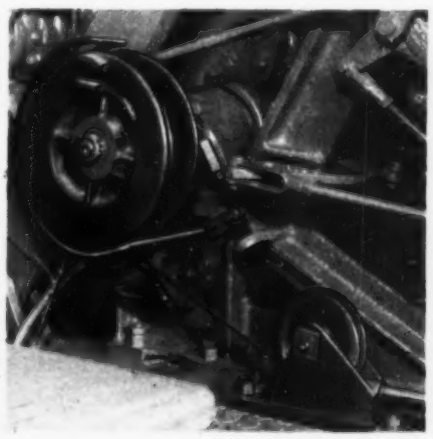
BAY CITY SHOVELS, Inc., BAY CITY, MICHIGAN

Export Office: H. M. Hein, 330 W. 42nd St., New York, U. S. A. (Oparo)

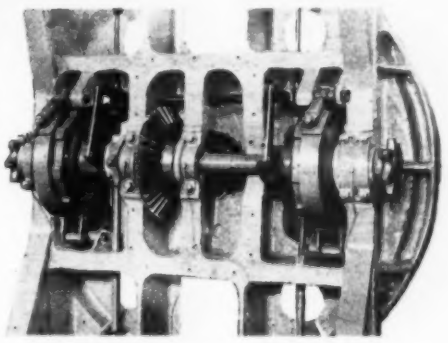


Wider working ranges, with bigger yardage result from this powerful one-piece crowd chain and it reduces maintenance costs.

Typical of BAY CITY performance in heavy frost is the output of this Model 20, ⅜ yard shovel working for T. J. Connor, Inc., Bridgeport, Conn.



Speed up shovel operation with this Electric Dipper Trip which adds 10 to 25% to daily yardage—there's no extra charge.



No stopping to shift—Fast, easy travel and steering under full power in either direction by simply applying pressure on cone clutches which operate brakes.

Single-piece unit-cast alloy steel car body and revolving table withstands shock and vibration successfully.

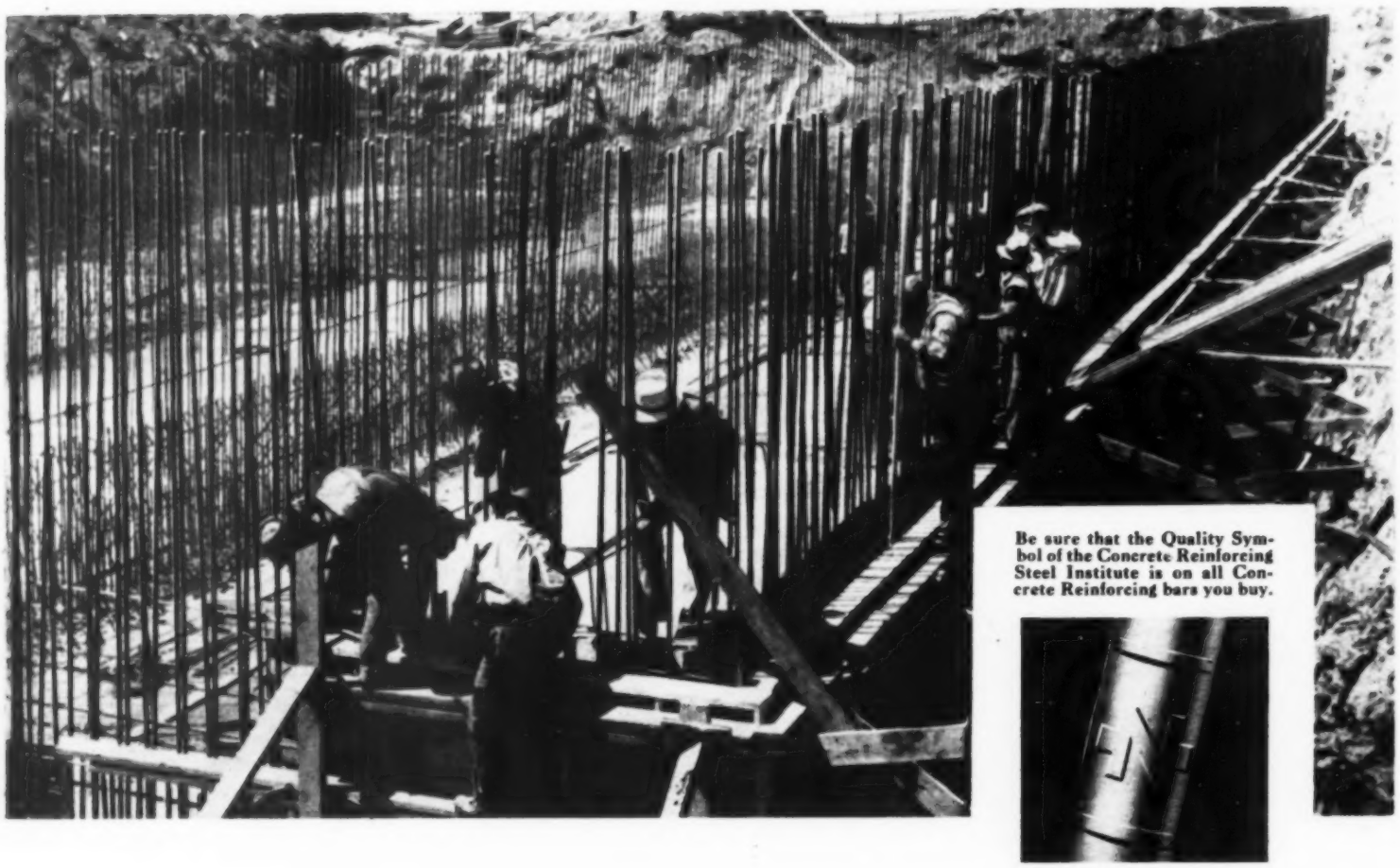
Helical gears give smoother, quieter operation and greater tooth contact affording longer wear.

Anti-friction bearings, even to boom point sheave, for low cost, efficient operation.

Standard long, wide crawlers with drop-forged shoes provide low ground pressures and added stability in heavy digging.

BAY CITY SHOVELS

How to get **TOP QUALITY** *Bars for every job*



Be sure that the Quality Symbol of the Concrete Reinforcing Steel Institute is on all Concrete Reinforcing bars you buy.

WHEN you specify concrete reinforcing bars for your next construction job you can be sure that high quality bars will be delivered if you specify U·S·S. They cost no more, yet give you the benefit of unexcelled manufacturing facilities and good workmanship. U·S·S Concrete Reinforcing Bars are produced from finest raw materials. Every step in their production is so carefully controlled that every bar comes through strong, full size and cleanly rolled.

A guarantee of high quality appears on every bar we ship—the Quality Symbol of the Concrete Reinforcing Steel Institute. This symbol assures you that the bars are rolled to standard specifications, and only from *new* billet steel. It tells you that they are a product of domestic manufacture. Insist on concrete reinforcing bars that carry this mark so that you can be *sure* of the quality and characteristics of the bars you buy. All U·S·S Concrete Reinforcing Bars carry this widely recognized Quality Symbol.

And there's another advantage in ordering U·S·S Concrete Reinforcing Bars. Our distributors are so located that you are assured of full service no matter where you want the bars delivered. Our distributors carry stocks of all standard sizes. Should you require bending or cutting of bars before delivery, this can be readily done to your specifications.

On your next order of Concrete Reinforcing Bars, specify U·S·S.

USS

CONCRETE REINFORCING BARS

Manufactured by

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Products Co., New York, *Export Distributors*

UNITED STATES STEEL

Load and Screen

the cheapest way!

BARBER-GREENE Bucket Loaders will load bulk materials from stockpiles to trucks cheaper than any other method.

They can be equipped with single or double deck vibrating screens—giving the cheapest loading and screening.

Bucket Loaders use less power, require less skill. They save truck time, man time, job time. They are used for loading, stripping, light excavating, unloading cars, etc. Their versatility makes them useful the year 'round.

Barber-Greenes with their Floating Boom, Automatic Overload Release, Tank Type Chassis, and other exclusive features are outstanding in quality, dependability, and ease of operation.

Write for full information on the High Capacity Model 82-A or the smaller, less expensive Model 552. There is no obligation.

38-12

BARBER-GREENE COMPANY, AURORA, ILLINOIS, U. S. A.

STANDARDIZED MATERIAL HANDLING MACHINES

Representatives in Principal Cities

BARBER GREENE

BRANCH OFFICES

Cleveland · Chicago · New York
Columbus · Boston · Detroit
For Canada — BARBER-GREENE

Standardized Belt Conveyors
CARRIERS
Portable CONVEYORS
Permanent CONVEYORS
and other standardized unit parts
SNOW LOADERS for high speed removal
MIXERS for Bituminous or Stabilized Mixing · Central or Travel Plant
Leveling-Tamping FINISHERS
LOADERS for lowest cost loading
Vertical Boom DITCHERS
Low Cost-High Quality Road Construction

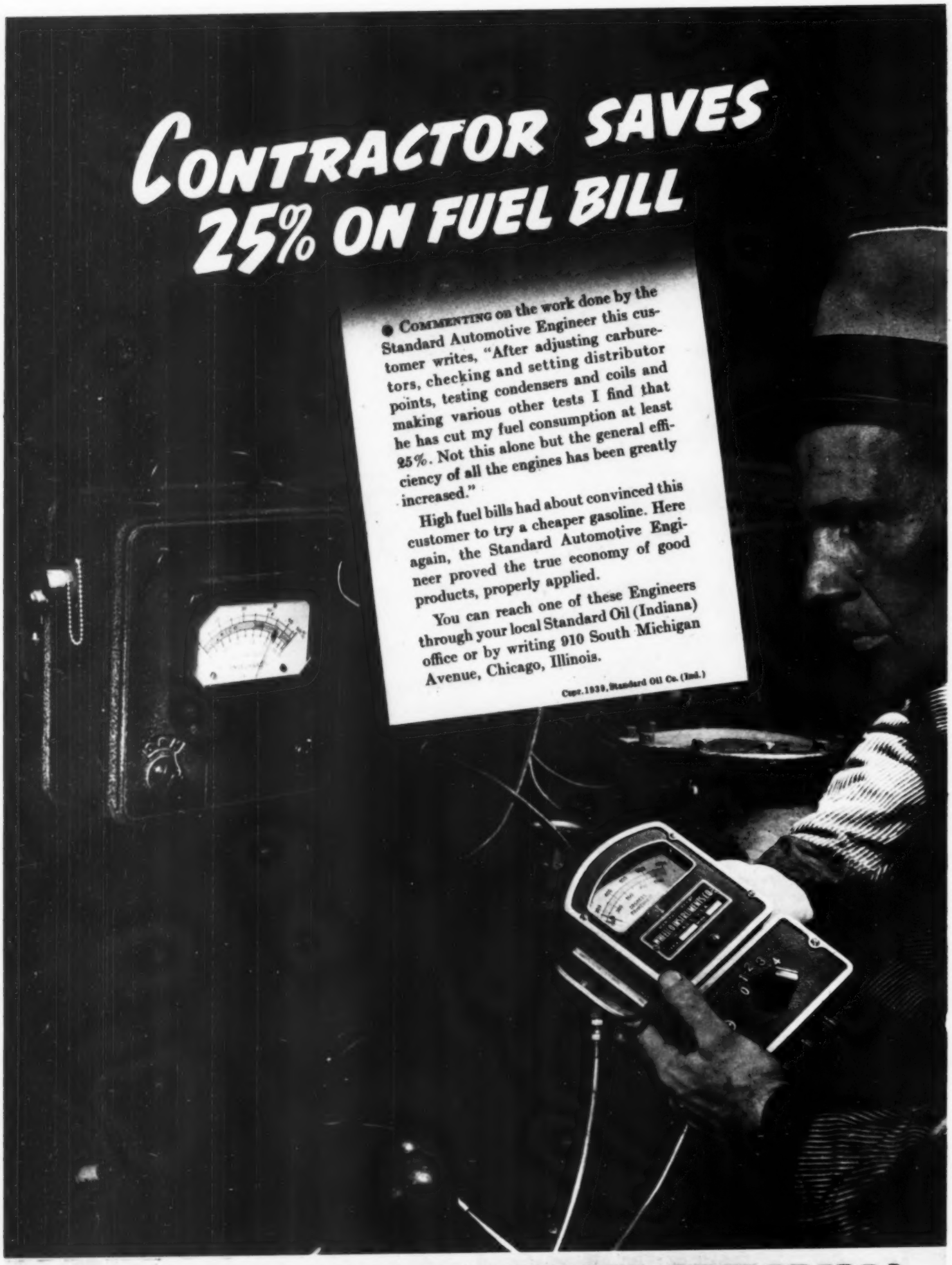
CONTRACTOR SAVES 25% ON FUEL BILL

● COMMENTING on the work done by the Standard Automotive Engineer this customer writes, "After adjusting carburetors, checking and setting distributor points, testing condensers and coils and making various other tests I find that he has cut my fuel consumption at least 25%. Not this alone but the general efficiency of all the engines has been greatly increased."

High fuel bills had about convinced this customer to try a cheaper gasoline. Here again, the Standard Automotive Engineer proved the true economy of good products, properly applied.

You can reach one of these Engineers through your local Standard Oil (Indiana) office or by writing 910 South Michigan Avenue, Chicago, Illinois.

Copr. 1939, Standard Oil Co. (Ind.)



STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE LOWERS MILEAGE COSTS

"50,000 YARDS OF MATERIAL Without Any Expense for Parts!"

O. D. Welden Town Superintendent of Highways Potsdam, New York

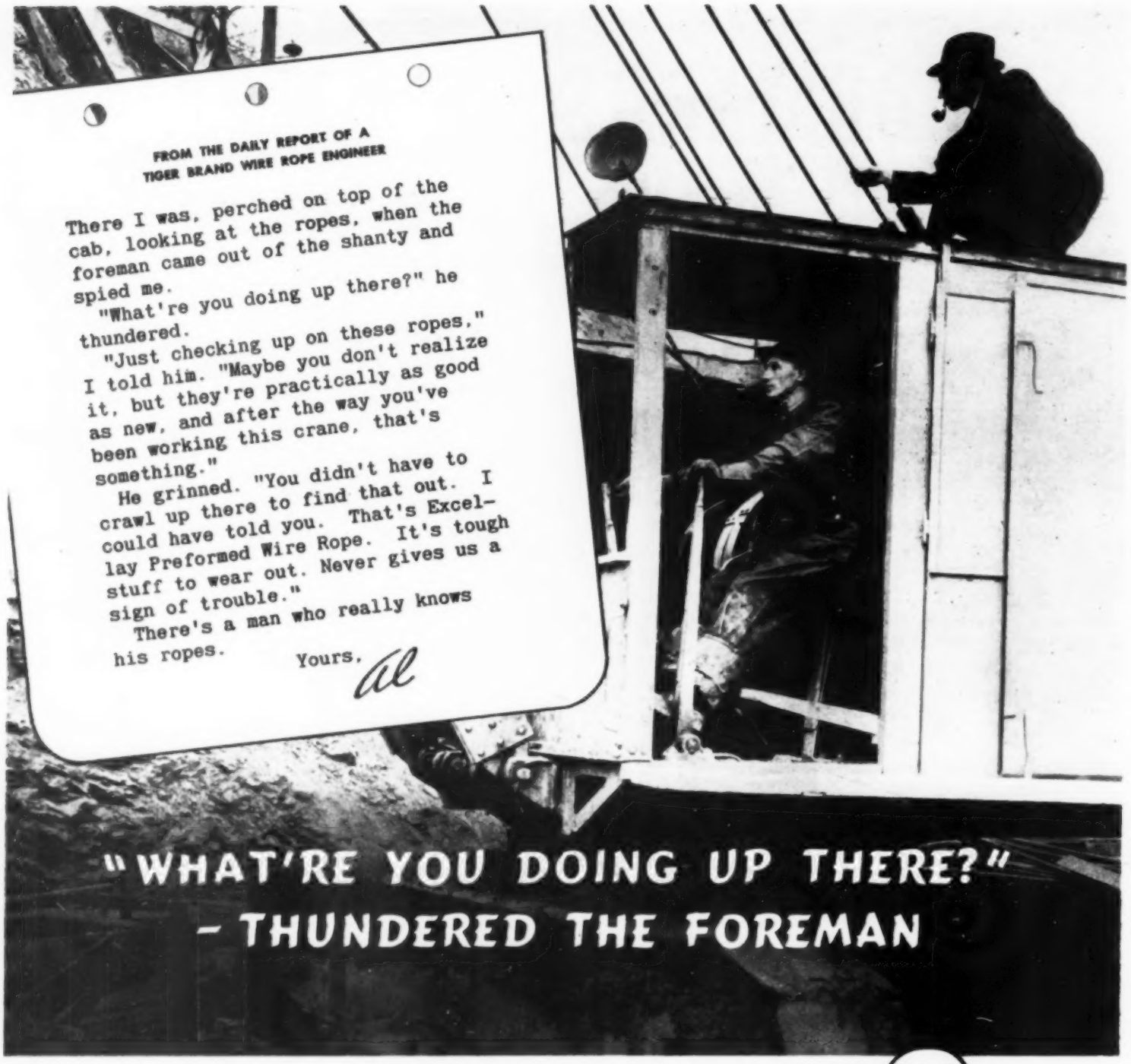
● It takes a lot of passes to pile up 50,000 yards with a 3/8 yd. shovel . . . in fact, that's 106,255 full dipper loads! Most machines would require replacement parts during or after a job like that, but not a penny was spent for parts on this P&H Bantam Weight. Even the original hoist cable was still in use. The greater strength and rigidity of P&H machines are the results of all welded construction of tough alloy steels —the design originated by P&H more than 5 years ago and which is now "5 years ahead of the field."

P&H EXCAVATORS 18 *Different Sizes* From ⅜ to 5 cubic yards Capacity; Gasoline, Diesel or Electric Power

Write for literature on the size and type that interest you. Address the Harnischfeger Corp., 4494 W. National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS


FROM THE DAILY REPORT OF A
TIGER BRAND WIRE ROPE ENGINEER
There I was, perched on top of the cab, looking at the ropes, when the foreman came out of the shanty and spied me.
"What're you doing up there?" he thundered.
"Just checking up on these ropes," I told him. "Maybe you don't realize it, but they're practically as good as new, and after the way you've been working this crane, that's something."
He grinned. "You didn't have to crawl up there to find that out. I could have told you. That's Excellay Preformed Wire Rope. It's tough stuff to wear out. Never gives us a sign of trouble."
There's a man who really knows his ropes.
Yours, Al
"WHAT'RE YOU DOING UP THERE?"
– THUNDERED THE FOREMAN

OUR field engineers are interested in seeing that you get a full dollar's worth of value out of every dollar you invest in wire rope. Most of their time is spent right out where the rope is used. There's no better place to keep in touch with wire rope performance.

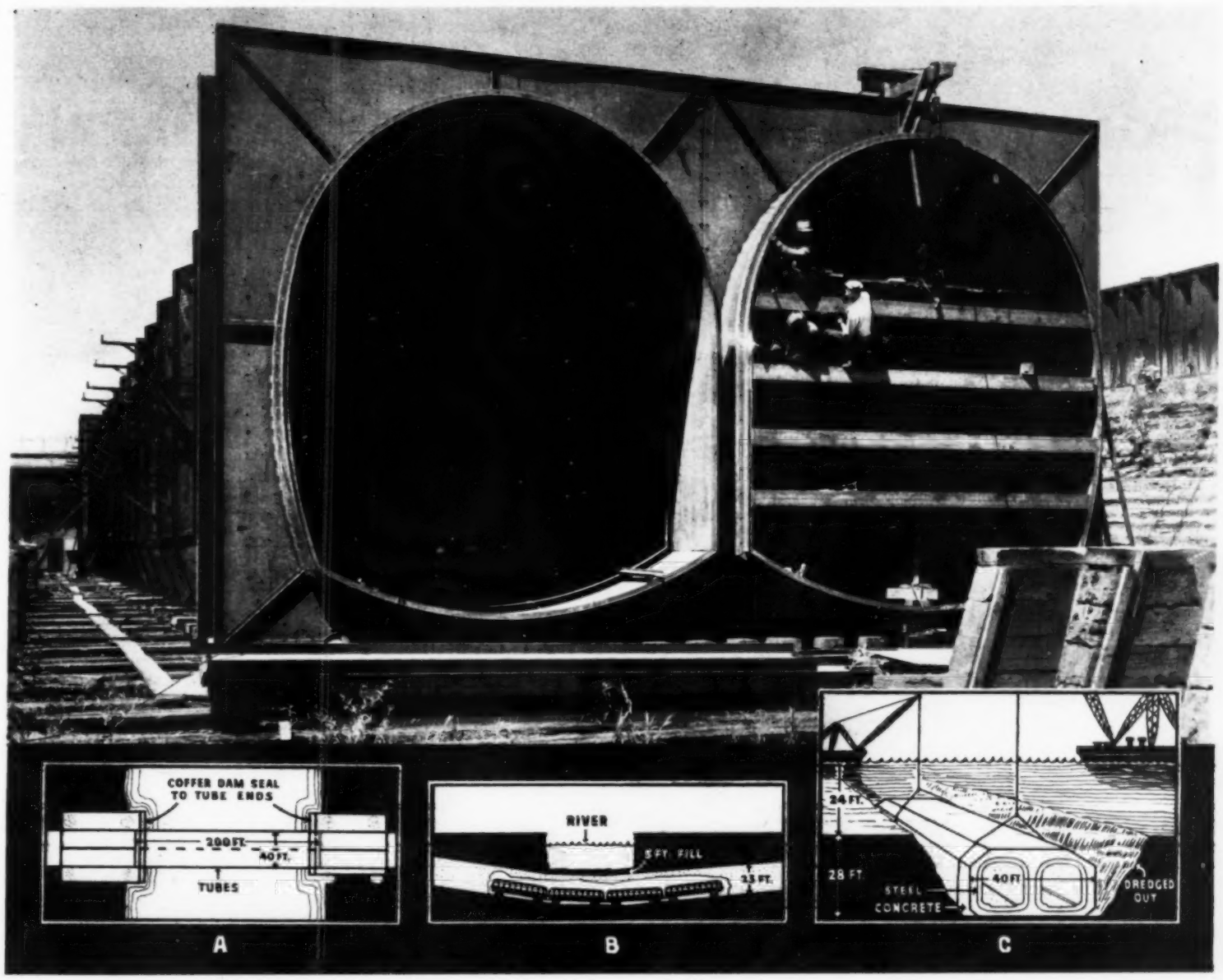
That's why these engineers are qualified to give you service that is both helpful and speedy. Besides helping you select the most practical wire rope, they can often give you valuable, money-saving tips on operation. Be sure to take full advantage of their wide experience.

American Tiger Brand Wire Rope is made in all constructions and grades. Our engineers can help you specify the type best suited to your job. Ask one of these men to call.

EXCELLAY *Preformed* **WIRE ROPE**

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



GIANT WELDED TUBE IMPROVES SUBWAY CONSTRUCTION

PROJECT—Twin tube river tunnel in Chicago's new subway system 200 ft. long, 40 ft. wide, 23 ft. high. General Contractors: Merritt-Chapman & Scott. Builders of welded steel tube structure: Graver Tank & Mfg. Co., Inc., E. Chicago, Ind.

CONSTRUCTION—Steel core structure, comprising 5/16-in. plate with T-bar stiffeners, all welded with Lincoln *"Shield-Arc"* Welders and "Fleetweld 5" Electrodes. Steel lined with concrete with inside and outside walls 1 ft.-3 in. to 3 ft. thick. Total weight of tube section 6,500 tons.

INSTALLATION—Tube section sealed at both ends by bulkheads and towed from dry dock 22 miles to Chicago River crossing. To be sunk into dredged channel. See (c). Connected and sealed to cofferdams at sides of river. See (a). Bulkheads then to be cut out.

ADVANTAGES—This method minimizes: (1) depth of tube below river bottom, (2) grade in approaching the tubes and (3) amount of excavation. See (b). Welding assures a strong, rigid structure with savings in weight and construction cost.

For details on other profitable applications of *"Shield-Arc"* Welding, consult the nearest Lincoln office or mail the coupon.

Largest Manufacturers of Arc Welding Equipment in the World

THE LINCOLN ELECTRIC COMPANY

CLEVELAND, OHIO

THE LINCOLN ELECTRIC CO., Dept. G-646, Cleveland, O.
Send free booklet ☐ "Welding in Construction Work."
☐ "The New *Shield-Arc*."

Name _____ Position _____

Company _____

Address _____

City _____ State _____

ONE MONTH SAVED—COLD WEATHER BEATEN

with Atlas High-Early Cement

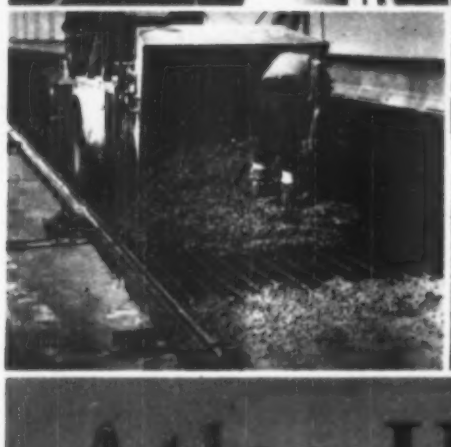
Bronx-Whitestone Bridge completed a month ahead of schedule — in time for opening of N. Y. World's Fair — thanks to Atlas High-Early cement

NEW YORK'S Triborough Bridge Authority ordered the Bronx-Whitestone Bridge opened one month ahead of schedule. It was early spring and cold when the decks of the bridge had to be paved. A rapid construction schedule was necessary in weather which was unpredictable more than 36 hours in advance. Further, it was difficult to apply heat effectively to the concrete slab during early hardening and curing. In short, a difficult, tough construction job to be completed on a definite time schedule.

These conditions suggested the use of Atlas High-Early cement. Why? Because with Atlas High-Early strength concrete, less time is required for protection and curing, thereby saving time and costs... because the concrete was safe from freezing within 36 hours under the temperatures which prevailed at the time the bridge was paved... and because the concrete was easily workable with a minimum of water. And so two 27½-ft. roadways 3,850 ft. long were concreted in 12 working days! One-and-a-half-ton batch trucks were hauling loads over the concrete in five days.

Whenever speed in construction is essential, either because of necessity or weather conditions, use Atlas High-Early cement — a cement with rapid-hardening qualities which gains strength several times faster than normal portland cement. Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Bldg., New York.

C-H-1



(*Above*)—**YOU'RE LOOKING DOWN** from one of the towers of the new Bronx-Whitestone Bridge across the East River, New York City, to the two-lane six-car roadway paved with Atlas High-Early cement.

• • •

(*Lower left*)—**LOOK AT THE CONCRETE**—see how workable it is. Note how free it is of segregation. (*Lower right*)—Closeup of road surface.

• • •

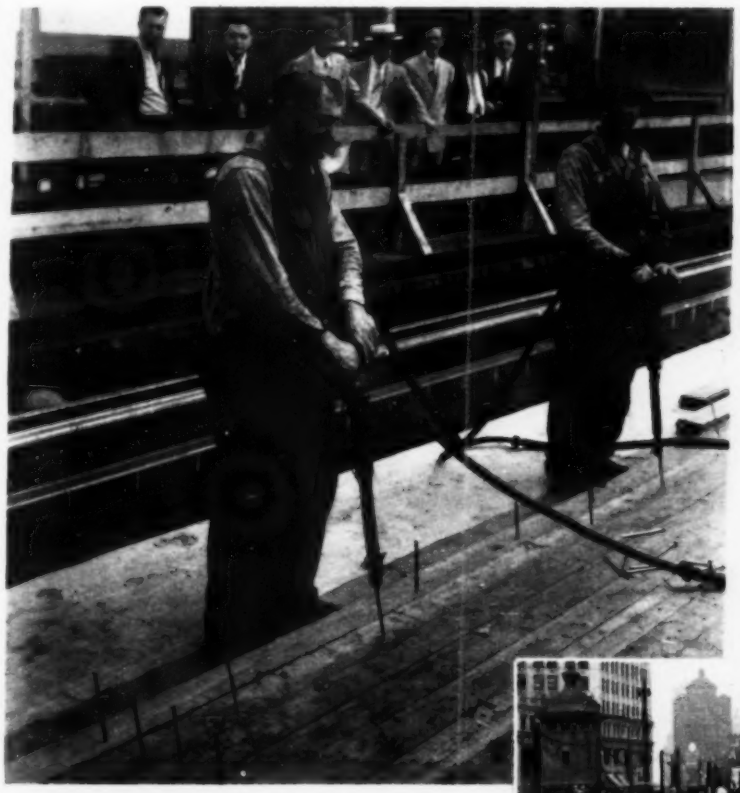
O. H. Ammann, chief engineer Triborough Bridge Authority; H. W. Hudson, engineer of construction, Madigan & Hyland, consulting engineers, N. Y.; American Bridge Co., General Contractors; Corbetta Construction Co., N. Y., sub-contractors on concrete

Atlas High-Early Cement

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 21 | NOVEMBER, 1939 | Number 11



DRIVING OF SPIKES to anchor timber sub-floor of Michigan Ave. bridge, Chicago, is done rapidly with pneumatic hammers.

PULLING OLD SPIKES from sub-floor of bridge, prior to redecking, is expedited by use of long-handled tongs or pincers.

REDECKING OF BASCULE BRIDGE involves roadway surface of asphalt planks on new timber sub-floor.

Hammer and Tongs

DRIVE AND PULL SPIKES IN REDECKING BRIDGE

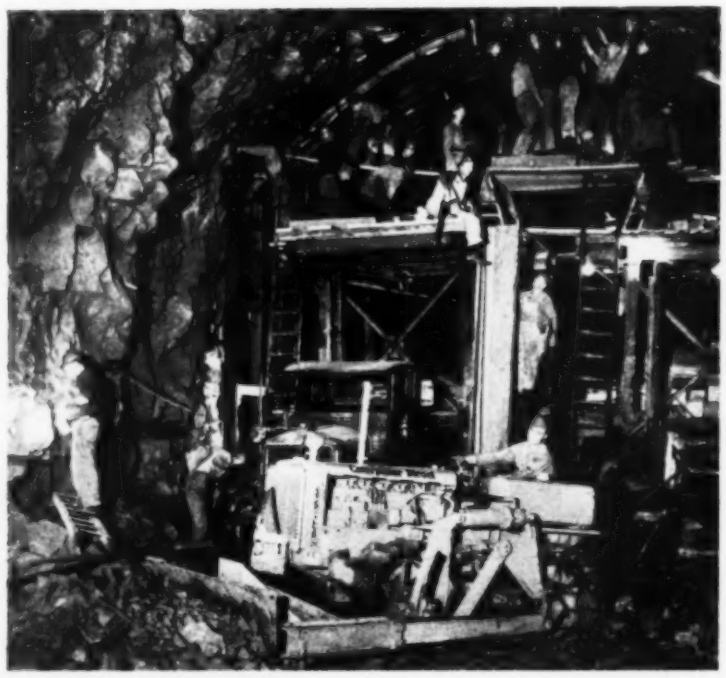
PNEUMATIC HAMMERS for driving new spikes and tongs or pincers for pulling out old ones helped the maintenance forces of Chicago's Department of Public Works redeck the 20-year-old double-leaf bascule span which carries Michigan Ave. over the Chicago River on two 27-ft. roadways 336 ft. long. The old bridge floor consisted of rubber blocks nailed to a deck of two courses of timber planks, a 3-in. sub-floor on a sub-deck of 6x12-in. creosoted pine.

In the reconstruction work only the rubber blocks and the 3-in. sub-floor were replaced. After the old rubber block surfacing was stripped off with pneumatic spades and chisels, the protruding spikes that held them in place were pulled out with pincers or tongs, as illustrated. In replacing the old sub-floor with a new one of 3x6-in. fir planking spikes were started by hand and then driven home with pneumatic, instead of hand, hammers. Then a new roadway of mineral surface asphalt planks was spiked to the sub-floor. Work was done under the direction of Loran D. Gayton, city engineer, Thomas G. Pihlfeldt, engineer of bridges, and O. W. Hansen, engineer of bridge maintenance.

SOMEWHERE IN POLAND. Wreckage of well known railway bridge spanning Weichsel River. Germans charge that retreating Polish troops dynamited structure to halt enemy advance.

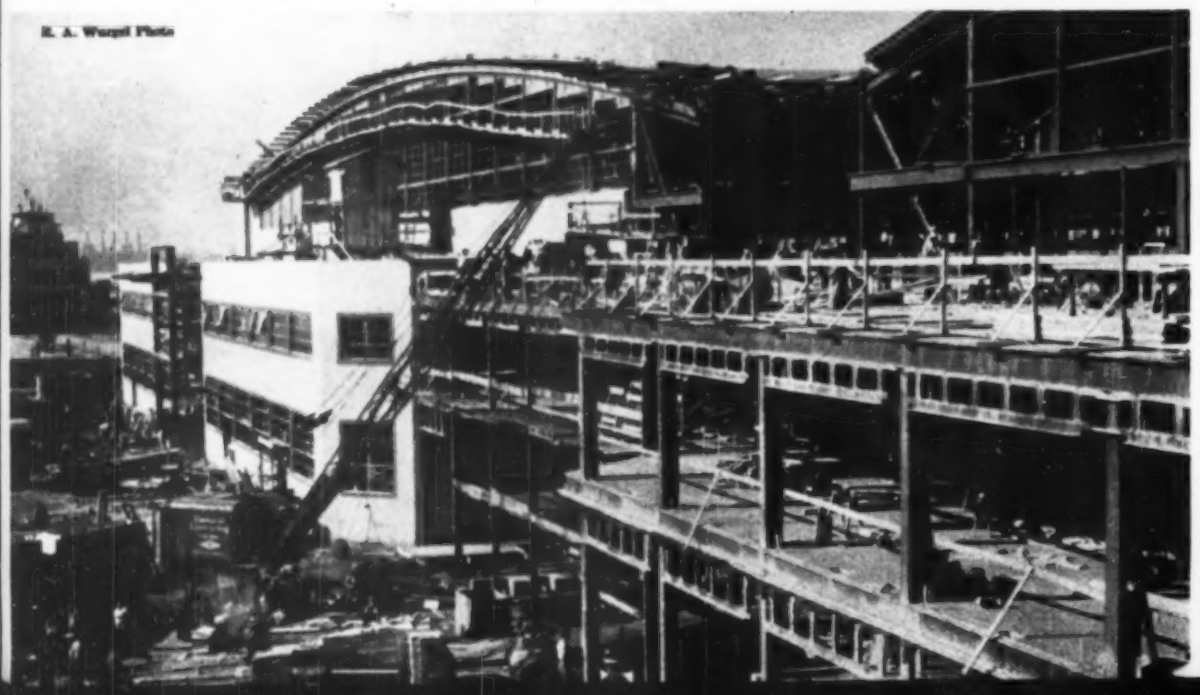
HANSEN DAM in California, Los Angeles County flood control structure being built by Guy F. Atkinson Co. on low bid of $5,688,000, will be world's largest dry fill, containing nearly 13,000,000 cu.yd. of earth, distributed in six zones. Structure will be 122 ft. high above river bed and 9,050 ft. long on crest. View herewith, looking east, shows intake and spillway, with tractor-hauled sheepsfoot roller compacting material in foreground. Outlet conduits connecting two structures are almost covered by embankment. Project is being directed by Lieut.-Col. Edwin C. Kelton, district engineer for U. S. Engineer Department.

THIS MONTH'S NEWS REEL

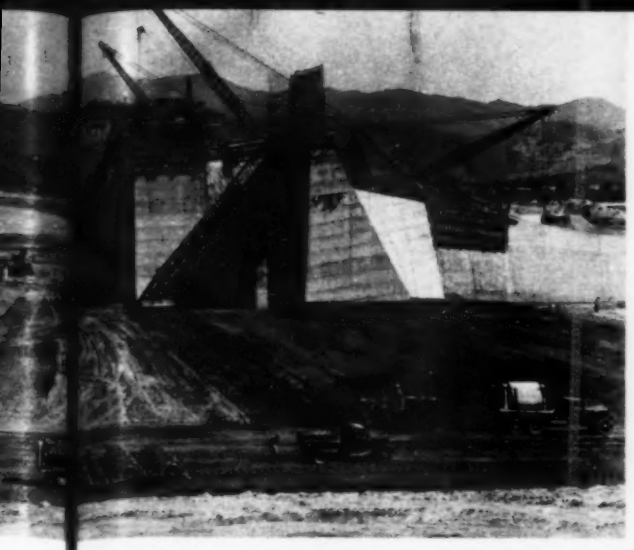


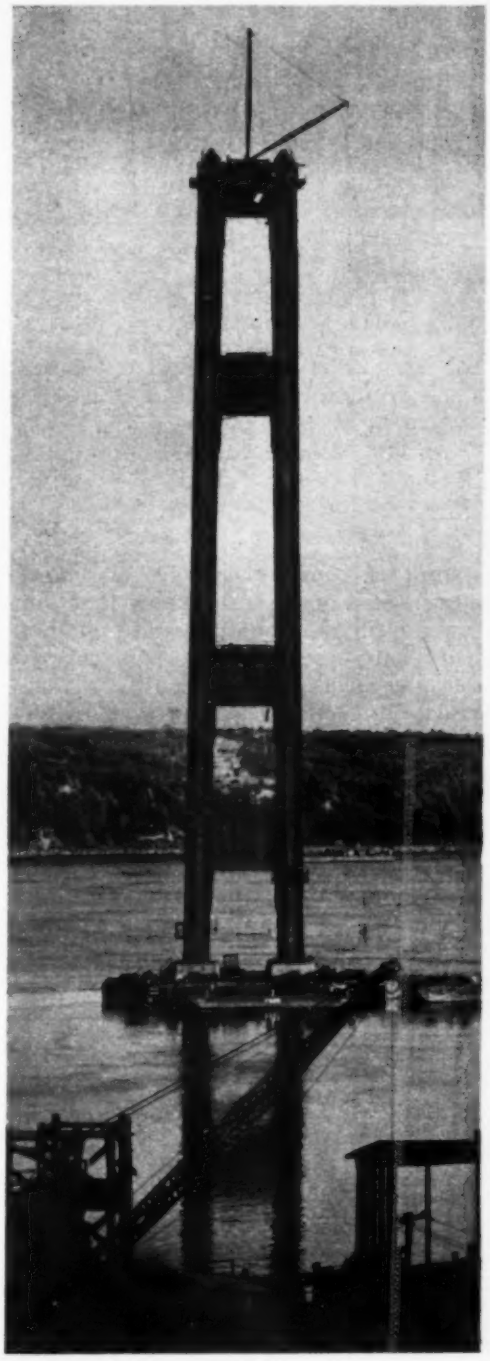
TUNNELING FOR TURNPIKE starts on Pennsylvania's $61,000,000 superhighway 161 mi. long now under construction between Harrisburg and Pittsburgh. In Laurel Hill rock bore Hunkin-Conkey Construction Co., of Cleveland, Ohio, sets steel bents for roof support as Caterpillar diesel tractor cleans up muck with LaPlant-Choate bulldozer blade.

AT NEW YORK'S MUNICIPAL AIRPORT (below). North Beach, Long Island, work is rushed by WPA forces to complete buildings in time for official dedication Oct. 15. Largest single undertaking of WPA, costing about $40,000,000, airport area of 558 acres, involving 17,300,000 cu.yd. of fill, contains hangars and other buildings with combined floor area, at present, of 931,500 sq.ft. Plane runways and taxi strips with asphaltic macadam surfacing cover 90 acres and concrete aprons, 53 acres.



MASS HOUSING IN NEW ORLEANS (below). takes form as low-rent brick structures are completed for Magnolia St. project. Bid of $2,478,980 by R. P. Farnsworth & Co., local builder, covering 723 units of 2,846 rooms in 55 structures was approved last spring by U. S. Housing Authority on recommendation of Col. L. Kemper Williams, chairman of Housing Authority of New Orleans for which Alvin M. Fromherz is chief engineer and executive director. Building illustrated is brick-wall structure of 8 apartments with roof framework ready for application of asbestos shingles.

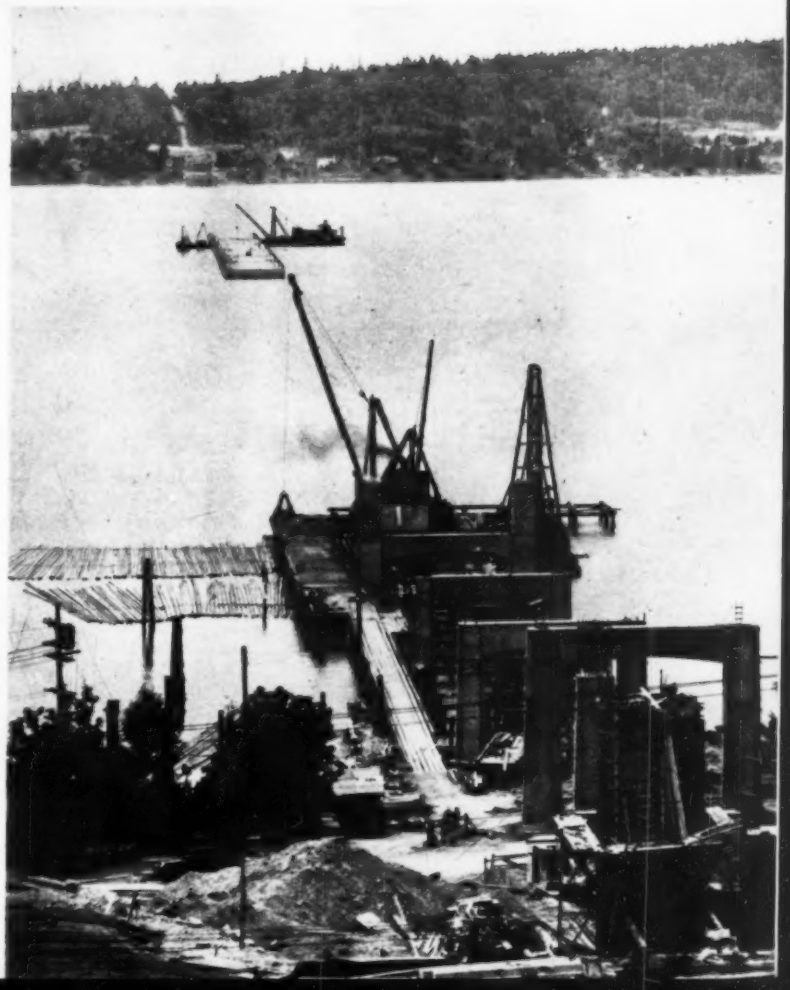




COMPLETION OF METROPOLITAN AQUEDUCT main line, which will deliver Colorado River water to Los Angeles and 12 other California cities, was marked by ceremony Oct. 14. When last cubic yard of concrete was poured at west portal of 13-mi. long, San Jacinto tunnel **(above)** construction of 242-mi. main aqueduct line was begun Dec. 24, 1932, by Metropolitan Water District of Southern California (F. E. Weymouth, general manager) and has involved placement of 4,000,000 cu.yd. of concrete and employment of 35,000 men and women. Directed by B. C. ("Mike") Leadbetter, general superintendent (in white shirt) final concrete **(left)** is shoveled into forms by W. P. Whitsett, chairman, and V. H. Rossetti, director, of Metropolitan Water District.

FOR NARROWS BRIDGE (left) across an arm of Puget Sound at Tacoma, Wash., Bethlehem Steel Co., under subcontract with Pacific Bridge-General-Columbia construction group, completes erection of west tower, 450 ft. in height, supported by concrete pier caissons. Structure of cable suspension type, with total length of 5,450 ft. has main span of 2,800 ft., side spans of 1,100 ft. and a 450-ft. approach of plate-girder construction at west end. Bridge will require erection of 13,920 tons of steel and, on basis of successful bid, will cost $5,949,730. Project is under supervision of Washington Toll Bridge Authority, of which Lacey V. Murrow is chief engineer.

FLOATING BRIDGE OF CONCRETE PONTOONS (right), will extend across Lake Washington, at Seattle, distance of 7,800 ft. Unique structure being built for Washington Toll Bridge Authority, by J. H. Pomeroy-Parker-Schram-Puget Sound Bridge & Dredging group, at low bid of $3,254,000, consists of 26 pontoon units anchored in water reaching maximum depth of 200 ft.



MODERN CONSTRUCTION DEMANDS *Small Tools*

Installation of New Building Materials Emphasizes Need for Power-Driven and Hand-Operated Light Equipment

By J. K. GANNETT
Vice-President, The Austin Co.,
New York City

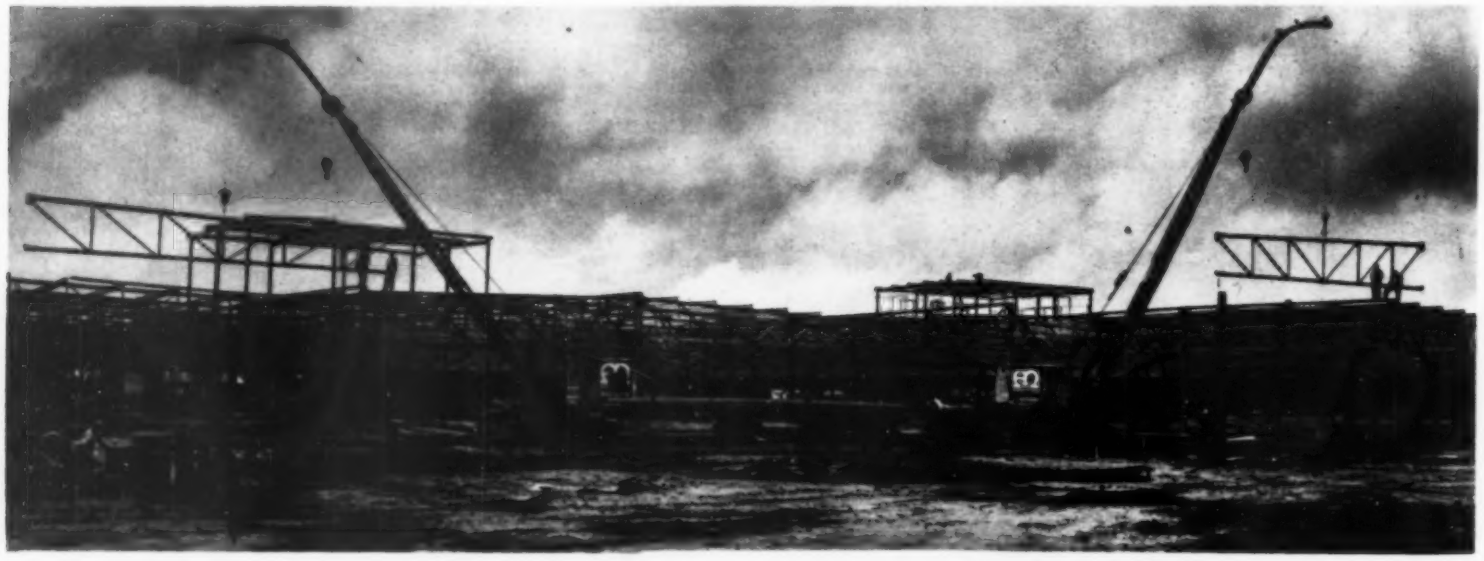
FASTENED IN JAWS OF BENCH VISE. screw punch (Whitney) is provided with substantial mounting for hard service

THE HIGH DEGREE OF EFFICIENCY prevailing throughout the major production industries presents a direct challenge to the industrial builder today. Accustomed to highly organized production methods, which are simplified by equipment which yields a high return for the man-hours expended, the industrial executive expects parallel performance in construction. In this industry every operation is carried on where the customer can see it, and construction tools have a major influence on his impression of an organization's efficiency. It is not only a question of the kind of tools in use on the job, but the efficiency with which they are handled, their general condition and physical appearance.

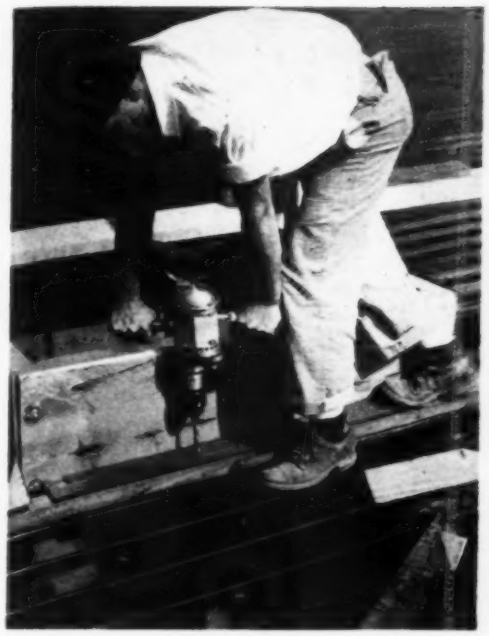
These considerations are matters apart from the more immediate problems of saving time and reducing costs by proper use of equipment best suited to the job, but they do influence the thinking of people who have the power of decision when contracts are made. They know that someone has to pay for all waste time and motion, and that they will somehow bear their share — whether the contract is on a lump sum or a cost-plus basis.

Because the availability, use and dispatching of efficient construction equipment bears such an important relationship to job costs, overhead and customer reaction, the whole problem is one for which general management must be directly responsible. It must establish purchasing, accounting, shipping, maintenance and inventory procedures and then maintain continuing contact with the individuals responsible for carrying them out.

In our own company, whose founder, Samuel Austin, emigrated from England in 1872 with his carpenter's tool chest,



AVIATION PLANT BUILDING in Indianapolis, Ind., designed and constructed by The Austin Co. for Allison Engineering Division (aircraft engines) of General Motors Corp., covers area of more than 250,000 sq.ft. On this project were taken most of the accompanying photographs illustrating typical applications of small tools and light equipment on industrial building construction



ON ROOF CONSTRUCTION electric drill (Black & Decker) bores hole through wood and steel in one operation

ORDERLY ARRANGEMENT of hand shovels, picks, hammers, tackle blocks and other equipment in sheds simplifies distribution and checking of tools. These facilities are duplicated on smaller scale in sheds at Austin Co. job sites.

familiarity with every aspect of equipment problems has always characterized the general management. Typical of this thinking were a drum hoist, one of the first of its kind, which Mr. Austin rigged up to speed the handling of lumber in his earlier days, and the first crawler crane, assembled by a field crew to eliminate the costly delays encountered in erection work.

New Factors Influencing Tools

The great variety of new construction materials now in use has served to emphasize the need for modern, power-driven tools. In laying metal roof deck, for instance, electric drills are practically indispensable except where the deck is spotwelded. Glazed tile, which is coming into wider and wider use in industrial interiors, cannot be properly cut by the ordinary brick chisel, but electrically-driven carborundum saws do this work with a speed and accuracy that remove most of the extra cost previously involved in the use of off-sized materials.

JAMES K. GANNETT, vice-president in charge of New York office of The Austin Co., engineers and builders, of Cleveland, Ohio.

The increasing popularity of architectural concrete, for instance, has been accompanied by the development of small electric sanders which are ideal for surface finishing. These have a widespread utility, since by varying the character of belt they can be used for general woodworking, sizing and polishing operations.

The use of electrically-driven tools in construction has been greatly aided by the broader accessibility of electric power as a result of rural electrification and private power extension programs. On projects of substantial size where power is not directly available, diesel generators are being profitably employed. These facts, plus the increased operating efficiency, relatively simple construction

WIRE MESH REINFORCEMENT for concrete floors of plant building is cut by hand tool (H. K. Porter, Inc.) with powerful leverage.

FLOATING OF CONCRETE FLOORS, prior to steel troweling, is done by battery of motor-driven machines (Kelly), with revolving disks.

and sturdy, fool-proof character of the electric tools now available, have left no alternative to their adoption as standard equipment in every progressive construction organization.

Factors Reducing Field Labor

At the same time, new construction equipment and materials have greatly reduced the amount of field labor, seasonal limitations on construction work, and the number of small tools required on many jobs. Patented and plywood forms, patented shores and patented scaffolding have largely eliminated much of the rough carpentry necessitated by concrete and masonry work.

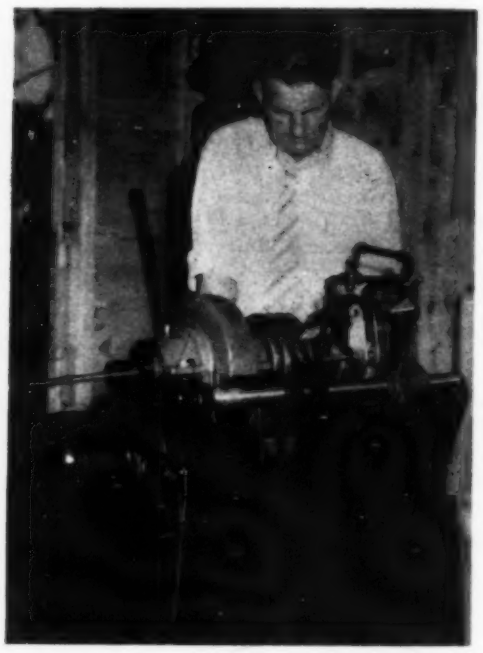
Paralleling this development has been the mastery of weather hazards so that work can proceed in absolute safety under the severest winter weather conditions. In one large project, recently completed, where masonry construction had to proceed through several months of near-zero weather,

ROOFING INSULATION BOARD of asbestos composition is cut in place by electric saw (Skilsaw).

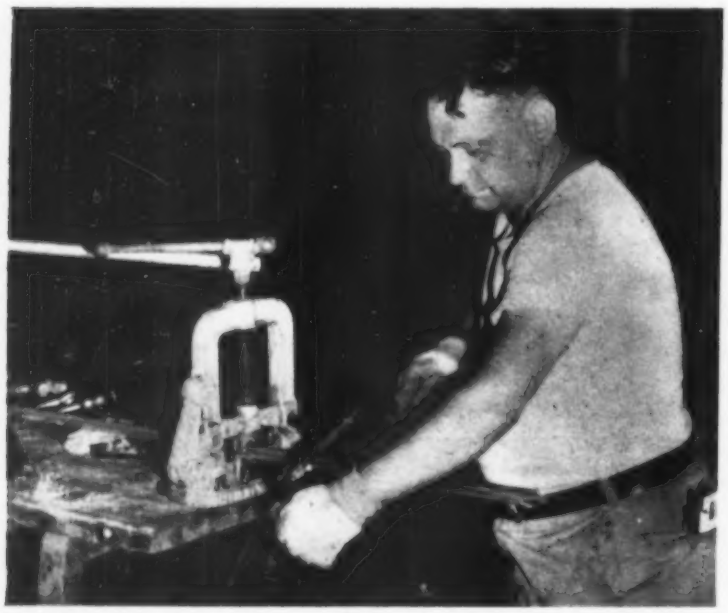
CUTTING OF LUMBER and various other building materials is done with electrically powered unit (Skilsaw) with rotating blade protected by metal guard.

JOINTS IN LIMESTONE COPING are made water-tight with aid of calking gun (Vital).

SPECIAL MOUNTING enables standard electric drill (Black & Decker) to be used as post drill for vertical boring of metal pieces.



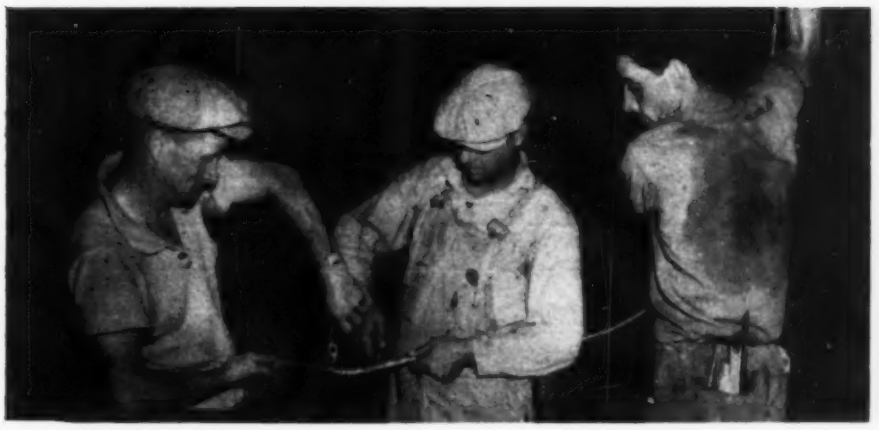
CUTTING AND THREADING of pipe and steel rods is accomplished quickly by portable machine (Toledo). Outfit has retractable wheels which can be swung into place when necessery to move to new location on job.



HACKSAW cuts flat steel bars to desired lengths as bench vise (Greenfield) holds material securely.

WOOD FORMS FOR CONCRETE are set up with aid of ties and spacers (Dayton Sure-Grip). Steel wedges are driven home with claw hammer.

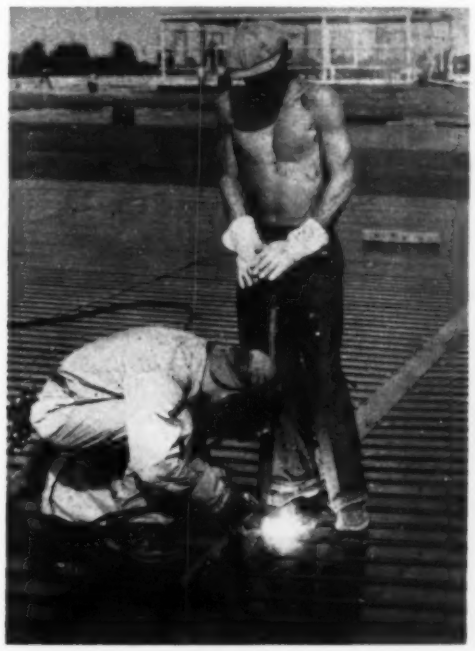
FOR END CUTTING OF NAILS AND WIRE close to concrete roof slabs or walls pliers (Carew) are handy tools



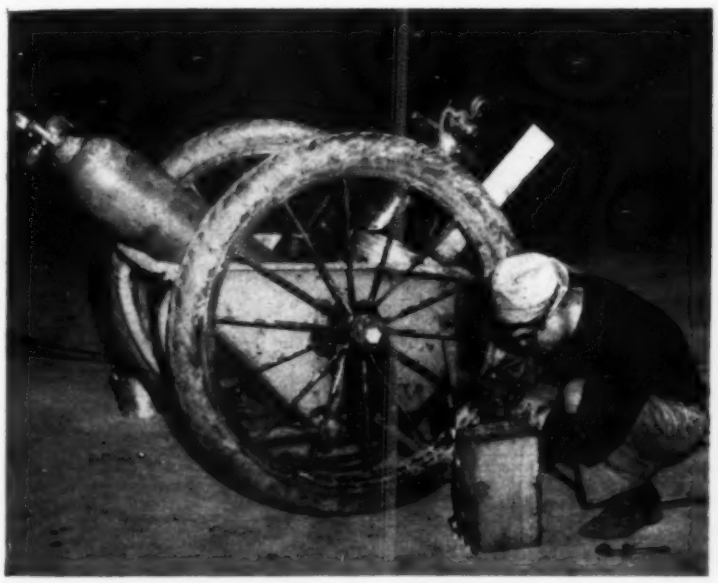
MESSENGER CABLE for support of electric conduit between steel trusses is served by two workmen with aid of pliers.

PORTABLE TABLE SAW, powered by electric motor, proves handy tool (Delta) for cutting roof insulating boards two at a time.

RUBBER TIRES on this wheelbarrow (Kilbourne & Jacobs) prevent damage to roofing surface and make traction easy with heavy loads.



ELECTRIC-ARC WELDING is effective in installing 18-gage steel roof deck and anchoring it to steel frame of building



FOR WELDING AND CUTTING with oxy-acetylene torch (Linde) this rubber-tired concrete cart, carrying gas cylinders, enables outfit to be moved quickly to various parts of job.

MAINTENANCE OF TOOLS is handled in shop on job. Here is how chisels are kept sharp with motor-driven grinder

work was carried forward day-by-day around the entire exterior with the aid of suspended scaffolding equipped with windbreaks and heated by oil-fired orchard stoves. These units, burning 24 hr. a day, proved much safer than the conventional coke or coal-fired salamanders, and the whole arrangement prevented mortar from freezing and enabled brickwork and glass block to set up over night.

Steel sash, special rolled moldings, metal and cement tile roof decks, structural glass, prefabricated steel paneling and partitions, and similar materials have all come into such widespread use that basic tool lists have had to be completely revised. A special small kit has been developed, for instance, to answer completely all the requirements for erection of prefabricated porcelain enamel, steel and glass service stations, of which several hundred have been sold within the last few years.

WIRING OF STEEL REINFORCEMENT is simplified by use of pliers in capable hands of E. H. (Pat) PATTERSON, veteran structural iron foreman with the Austin organization for 15 years.

Getting Tools to the Job

Over a long period of time standard tool lists have been developed for jobs of various types and sizes, and these are always kept up-to-date as the development of new tools and improved construction methods materializes. Shipment of miscellaneous small tools has been greatly expedited by the availability of sturdy tool boxes in a large range of sizes, specially designed for service on the job. These boxes are outfitted with the required equipment when a contract comes in and are ready for loading on flatcars or trucks when they arrive at central storeyards, which are situated in strategic locations in each construction district. Crane loading facilities at the yards make it possible to handle boxes of any desired size. These boxes can stand out-of-doors adjacent to the tool house set up for the job and inside of which rope, hose, tarpaulins, other perishable equipment and power tools are stored.

SUPERINTENDENT OF CONSTRUCTION for The Austin Co. on aircraft engine plant building for General Motors Corp., at Indianapolis, is W. T. KROWARZ.

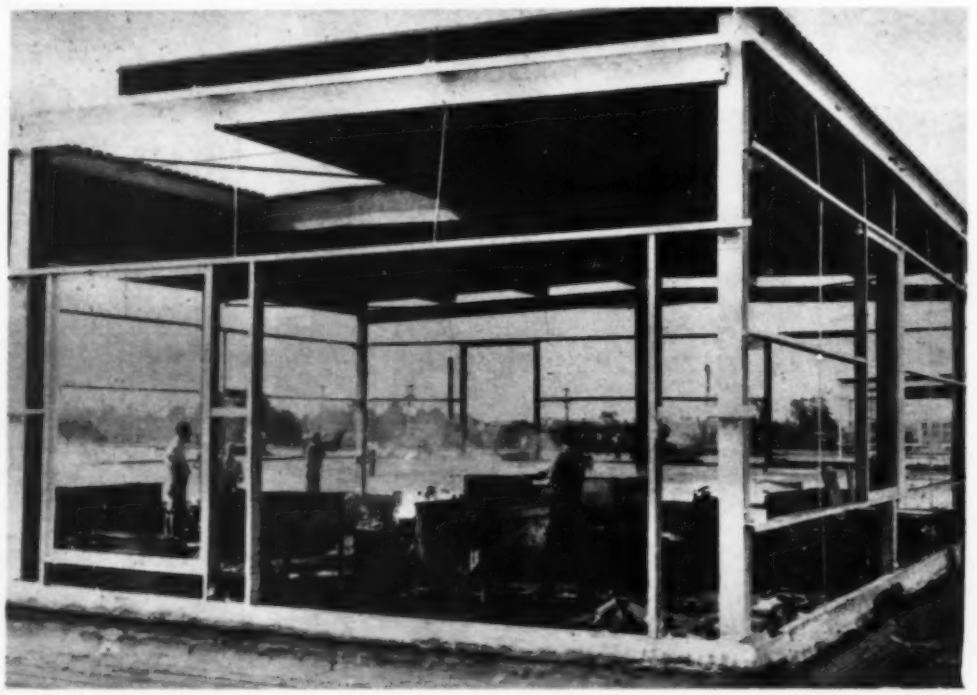
Electric and other power tools are delivered to the job in special individual boxes, each of which includes full equipment for the efficient use of the particular tool. Electric saws, for instance, are packed with their own cord, sometimes an extension, and always several extra weather-proof sockets. Extra blades, embracing a full variety of sizes, a tin of grease of a recommended type, and wrench or other service tools required in using and changing setups are all included in this package. In the case of pneumatic riveters, the box contains an assortment of extra plungers, springs and rivet snaps, covering a full range of sizes. Burning and cutting torches are likewise distributed with a number of extra small parts which might be required. Acetylene units, including tanks and kit, are set up on hand trucks for simple handling anywhere on the job.

Servicing Hand-Operated Power Tools

The servicing of hand-operated power tools in the field is an important element in maintaining job efficiency. With one individual directly responsible for all maintenance and an established routine for inspection, tightening and lubrication of such equipment at short intervals, difficulties which produce lost time can be reduced to a minimum. The importance of having the right type of grease for every tool cannot be overemphasized.

If the man in charge of maintenance has the manufacturers' parts lists and operating instructions on file at the job, replacement parts can be ordered by number without confusion and with a minimum of delay. In this connection it is highly important to know just who are the dealers and service branches

(Continued on page 96)

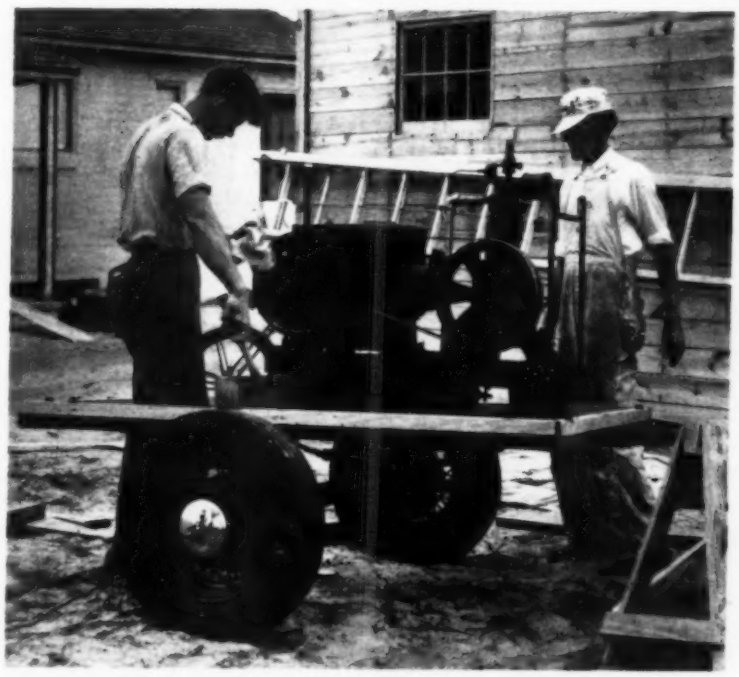


FOR ROOFING OPERATIONS battery of kettles (Aeroil) in penthouse heats bituminous materials prior to delivery at point of use.

Power Tools

SPEED CONSTRUCTION OF JACKSONVILLE LOW RENT HOUSING

CARBORUNDUM BLADE on electric table saw cuts concrete blocks for use at doors and windows.



COMPRESSOR UNIT for spraying second coat of portland cement paint is mounted on pneumatic-tired trailer for easy portability.

EXECUTING A $715,000 CONTRACT for the erection of 40 one- and two-story apartment buildings containing 230 living units of 998 rooms at the Brentwood Park project of the Housing Authority of Jacksonville, Fla., the J. A. Jones Construction Co., Charlotte, N. C., followed a straightforward plan of progressive construction designed to complete the houses and auxiliary service facilities on a 23-acre plot in a contract period of 300 calendar days. A number of ingenious methods aided the economical construction of the buildings, as indicated by photographs accompanying these notes. The general contractor performed about 40 per cent of the work and sublet the remainder to eighteen subcontractors.

With the exception of wooden trusses and sheathing supporting the tile roofs, the buildings are structurally fireproof. Exterior loadbearing walls are built of lightweight hollow concrete blocks, and interior columns, girders and floor slabs are reinforced concrete. Hollow tile partitions separate

CONSTRUCTION OPERATIONS are coordinated and directed by H. V. Appen, general superintendent for J. A. Jones Construction Co., Inc., Charlotte, N.C.

LOAD-BEARING EXTERIOR WALLS of hollow concrete blocks made with light-weight aggregates are laid up in portland cement mortar by masons working from inside scaffold supported by folding horses. In background are typical one-and two-story buildings. House at right has received first coat of portland cement paint.

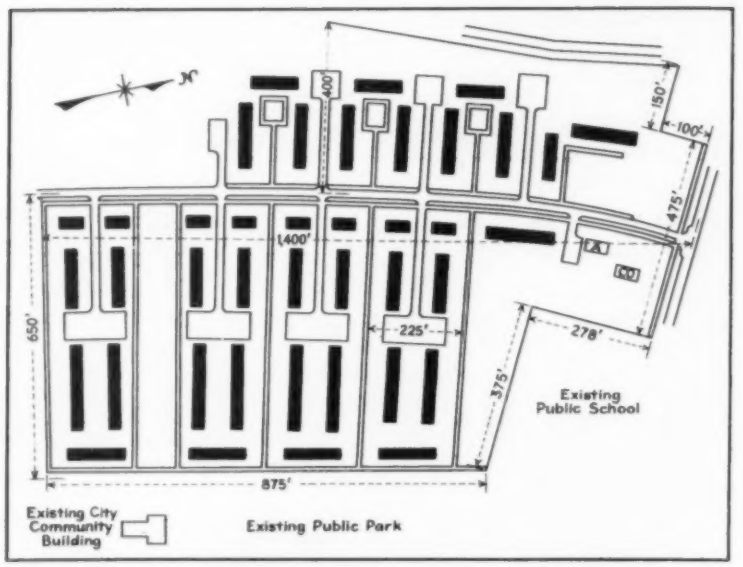
the living units. Metal door bucks are used throughout, but windows and doors are of wood.

Housing Project—A desirable site for the project was found just 2 mi. from the heart of the city, in a section adequately served by bus routes. The Housing Authority purchased 53 acres, half of which is being developed in the present project, leaving 30 acres for future development.

Funds to take care of 90 per cent of the cost of the Brentwood Park project, which totaled about $950,000, including the cost of the land, were provided under loan contract by the U. S. Housing Authority. This organization approved all plans for the project and maintained a supervisory interest during construction.

Rapid Progress—Prompt action by the Housing Authority of Jacksonville in taking advantage of opportunities offered by the Wagner-Steagall act put Brentwood Park in the front rank among Southern projects aided by the U. S. Housing Authority. About 20 families moved into completed living units in July, and the remaining units were to be ready for occupancy by October. Foundation construction got under way Dec. 1, 1938.

Base Rent—Construction cost of the houses at Brentwood Park is $600 per room, and the base rent is $2.44 per month per room. In common with all other projects in the U.S.H.A.



BRENTWOOD PARK HOUSING PROJECT. Jacksonville, Fla., consists of 40 one- and two-story multiple-dwelling houses covering only 12 per cent of land area on 23-acre site. Service drives from main street through project give access to rear of buildings in various groups. Two units marked A and CO are administration and community buildings for project.

SUCCESSIVE OVERLAPPING COURSES of interlocking tile are laid by roofers with aid of wooden straight-edge.

ELECTRIC HAMMER DRILL operated by d.c. power from compact transformer puts holes in concrete slab to anchor metal base.

HOUSING PROJECT is built under direction of (left to right): Ray O. Edwards, executive director, Housing Authority of Jacksonville, Fla.; Perry McKee Teeple, construction adviser, U. S. Housing Authority; Mellen C. Greeley, chief architect, Six Associated Architects; and Joseph H. Bryson, assistant architect.

ASPHALTIC DAMP-PROOFING is sprayed on scratch cement coat applied to inside of exterior masonry walls. Metal corner beads are installed around edges of windows and bull-nose screed is set at sills before plaster is applied.

VERSATILE POWER SAW in carpenter's yard cuts lumber for roof trusses and other purposes.

ROOF TRUSSES are assembled, drilled and bolted at two bench templets.

program, the loan is to be amortized in 60 years. To make low rents possible, the projects receive annual federal subsidies equal to 3½ per cent of the capital cost.

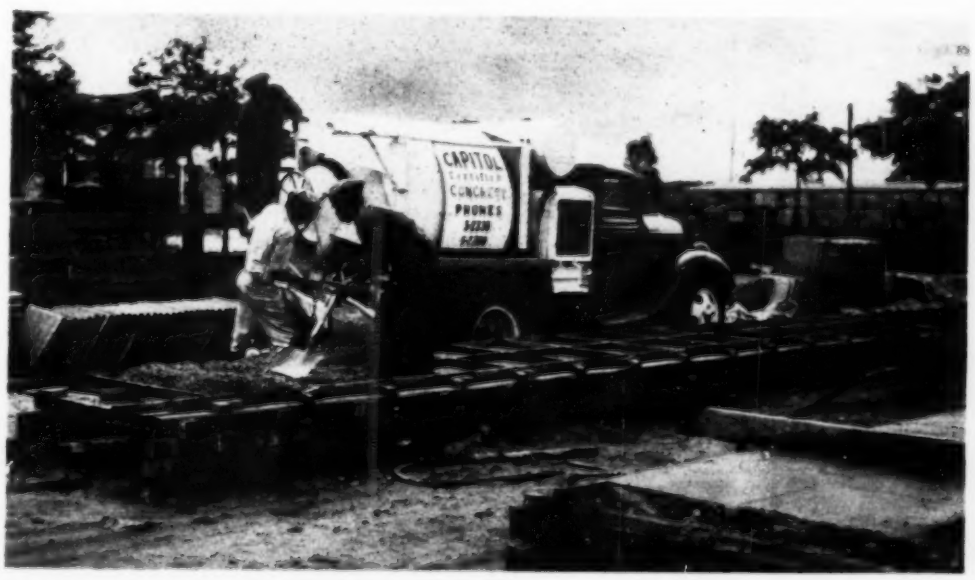
Building Design—Houses at Brentwood Park range from one-story buildings containing two living units to two-story structures, with one-story wings, containing a maximum of nine apartments. Twenty one-story buildings provide 76 three-room and four-room suites. Central two-story structures of the other twenty buildings conform to a standard plan providing four five-room duplex apartments and one three-room first-floor suite—a total of 100 living units in the two-story elements. One-story wings attached to both ends of the two-story structures contain 54 three-room and four-room suites. Each apartment has individual front and rear entrances.

Previous experience in Jacksonville with the Durkeeville project, sponsored by PWA, provided practical basic information on which to work in developing an improved, simplified design for Brentwood Park.

Construction Features—Exterior walls and interior columns of the houses rest on concrete spread footings on sand

(Continued on page 102)

PICKING ROOF TRUSSES from stacks set on ground near building, crawler crane with extended boom erects unit every 45 sec. or less.



STEPPING STONES FOR WALKS are cast on job in flat-bed molds filled with concrete by truck mixer. Flexible-shaft vibrator consolidates concrete in place.

CALKING GUNS apply sealing compound around door and window frames.

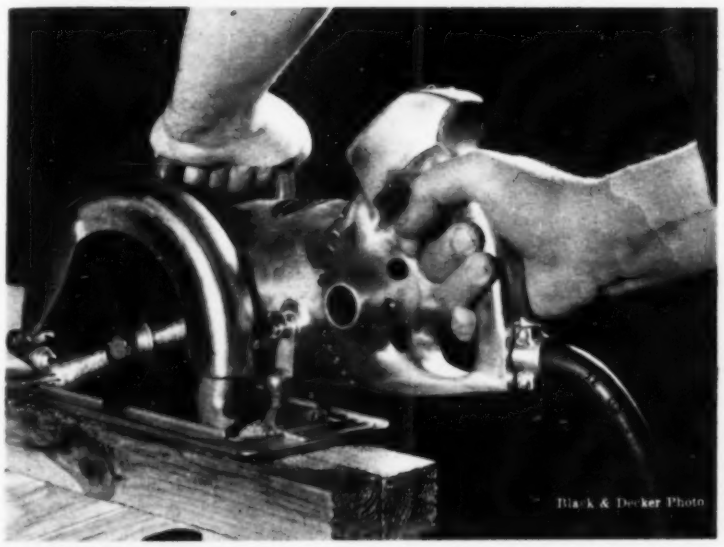
PORTABLE ELECTRIC TOOLS (right) have revolutionized methods by making it possible to bring tool to stock rather than move stock to stationary machinery.

INSECURE FOOTING is responsible for many accidents that occur in operating electric tools.

HOW TO OPERATE PORTABLE ELECTRIC TOOLS *Safely*

By E. W. MYERS
Engineer, American Mutual Liability Insurance Co.,
Boston, Mass.

REGULAR MAINTENANCE of portable hand tools is important. At end of shift equipment should be returned to its protective case **(left)**. Cables, connections and plugs should be inspected regularly and repaired when necessary **(right)**.

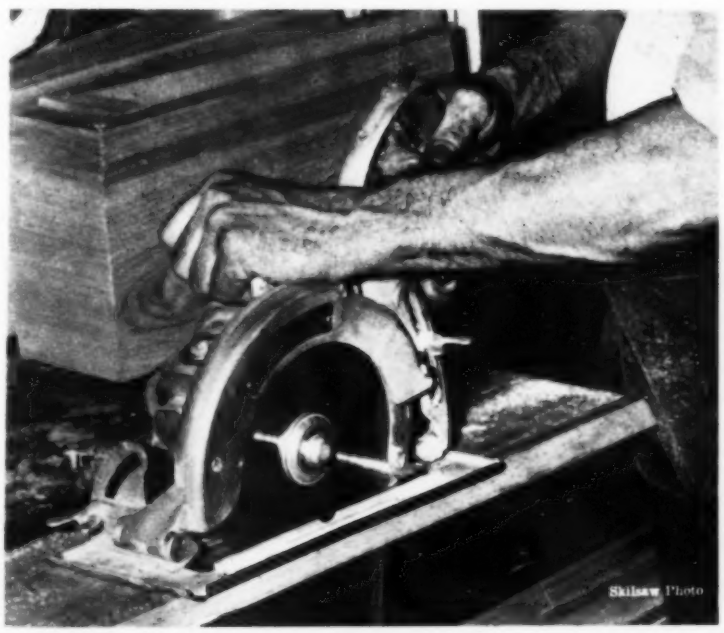


FIRM GRIP by operator is necessary for safe operation of hand tools.

MORE THAN 5,000,000 PORTABLE ELECTRIC TOOLS are now in industrial and commercial use in the United States according to the estimate of one large manufacturer. They are found everywhere. Nobody knows how many more millions of portable electric tools are in home workshops. These portable tools not only have replaced many common hand tools, thus doing away with laborious and tiresome operations, but they have replaced much stationary machinery.

As in the case of other innovations, the portable tool brings with it hazards to the user. To the usual hazards of machinery—exposed moving parts and driving mechanisms, points of operation and the handling of stock to and from the machine—must be added two types of hazards peculiar to portable electric tools: (1) the portable use of electricity; and (2) the handling of the tool itself.

Before examining these two special hazards, the usual machine hazards may be briefly reviewed. The moving parts and drive mechanisms do not present an important hazard since the motor, the reducing gears, and most of the revolving spindles are incased in an aluminum or cast iron housing by the tool manufacturer, and there they stay for the life of the tool. Not even the plant maintenance department gets inside that housing very often, and then, of course, the tool is disconnected from the power line. For major repairs it is customary to return the tool to the maker.



ADEQUATE MECHANICAL GUARDING is safety feature of this portable electric saw.

Safety Guards—The degree and kind of point-of-operation hazard depend upon the particular tool head being used. In general, the tool heads are safeguarded in much the same way as similar heads used on stationary equipment. Drills, screwdrivers, hole-saws, nut runners, hammers, sanders, polishers and similar heads do not require special guarding. Circular saws, grinders, and cutters do require point-of-operation guards.

The blade of a portable circular saw should be entirely covered by a guard around the circumference. These guards usually are of the telescoping variety so that the guard opens up as the saw blade enters the stock, and is closed by a powerful spring as the saw emerges. Such a guard is supplied as standard equipment on the better made saws and, in any case, should be insisted upon by the purchaser.

The top half of the wheel on portable grinders should be inclosed with a steel guard strong enough to retain the fragments of the wheel if it should break. Wheels less than 2 in.

SAFETY GUARDS protect operator of grinder, but for complete insurance against accident he should be equipped with safety goggles.

in diameter need not be inclosed. The surface speed of the wheel should not exceed 6,500 ft. per minute when ordinary wheels are used. Special bonded high speed wheels may be operated safely up to 9,000 ft. per minute. When it is necessary to grind the interior of a shell or some other part where space is restricted, a small diameter grinder preferably should be used. If a wheel more than 2 in. in diameter is used without a protective hood it is desirable to use safety flanges, safety washers, and the special bonded high speed wheels. Using high speed wheels at ordinary surface speeds provides an extra margin of safety in such a case. There is, however, no really dependable substitute for a substantial steel hood, since even high speed wheels can "explode," and since safety washers and flanges do not always hold.

Eye Protection

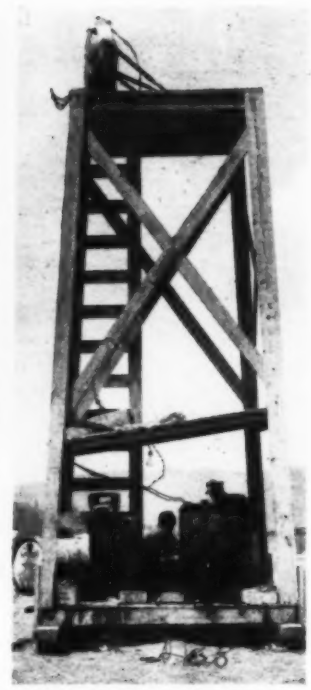
It is not always realized that portable grinders present the same dangers to the eyes of the operators as stationary equipment of the same sort. The only effective safeguard is goggles or face shields, and when men are equipped with goggles with side shields, eye injuries are practically eliminated.

(Continued on page 104)

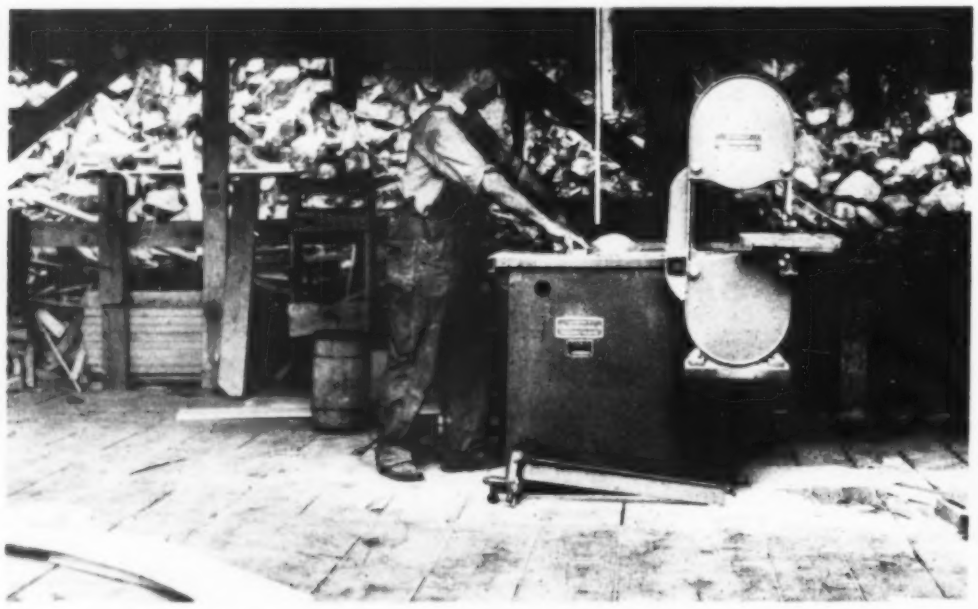
Small Power Tools
ARE TIME SAVERS FOR PENNSYLVANIA TURNPIKE JOBS

TO SPEED COMPLETION of the Pennsylvania Turnpike, 161-mi. trans-mountain superhighway which pierces seven ridges between Harrisburg and Pittsburgh by means of tunnels, 55 general contractors and 35 subcontractors are using a multitude of small power tools and hand tools.

TO COMPACT BACKFILL around concrete pipe culvert on grading section built by Jacobson & McKinley, Pittsburgh, for Herman Holmes, Crystal Falls, Mich., contractor uses two pneumatic hammers (Ingersoll-Rand) supplied with air by one gasoline-powered 105-c.f.m. compressor.



FLOODLIGHTING TOWER (right) mounted on sled serves York Engineering Co., York, Pa. Large 4,000-w. plant and smaller reserve unit at base of tower furnish power for two floodlamps and incidental lighting

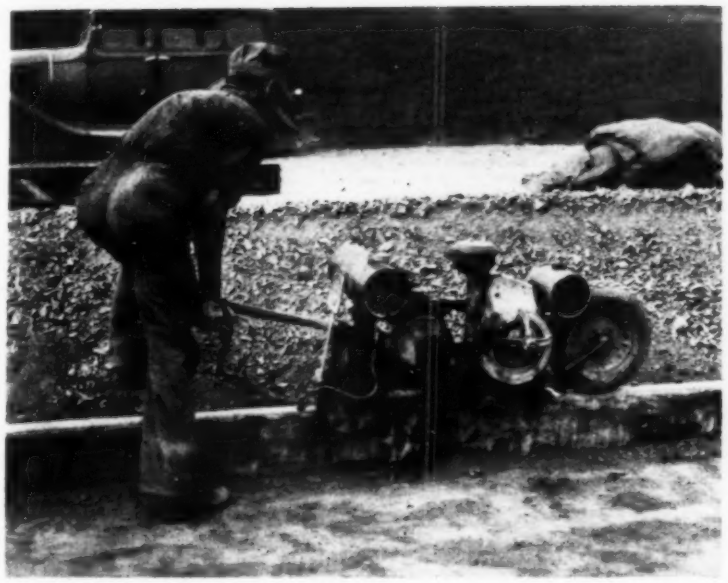


TO FABRICATE SHAFT FORMS for bridge across Dunning Creek at Bedford, M. Bennett & Sons, of Indiana, Pa., contractor, build job shop equipped with combination circular and bandsaw (C.H.&E.) driven by electric motor.

CUTOFF SAW equipped with 36-in. blade belt-driven from 10-hp. electric motor cuts tunnel timbers for Hunkin-Conkey Construction Co., contractor, at west portal of Laurel Hill tunnel. (Jones Superior Machine Co. saw, Westinghouse motor).

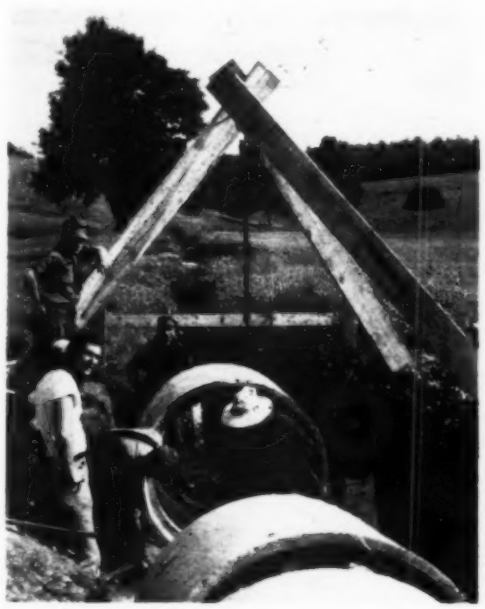
FOR RIGID FRAME OVERHEAD being built by John F. Keelor, Green Lane, Pa., for Empire Construction Co., Baltimore, Md., contractor, carpenters cut plywood sheets into proper sizes for lining concrete forms. Pneumatic-tired hand carts distribute concrete to forms from hopper, suspended from boom of paving mixer at right

CONTRACTOR'S LIGHT PLANT on paving job of Walker Bros., Chambersburg, Pa., is made up of 0.75-kva. 120-v. a.c. gasoline-powered generator (originally used to drive concrete vibrator) supplying current to four 100-w. lamps. (Electric Tamper & Equipment Co. generator).



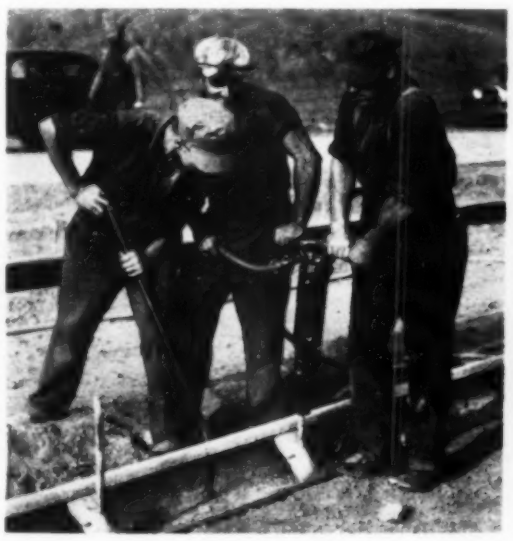
MECHANICAL TAMPER compacts earth fill under bottom of steel road forms on first Turnpike paving contract, being built by Walker Bros., Chambersburg, Pa. Automotive tamper travels on top of form, and side arms deliver rapid, tamping blows at both sides of base. (Lakewood mechanical tamper).

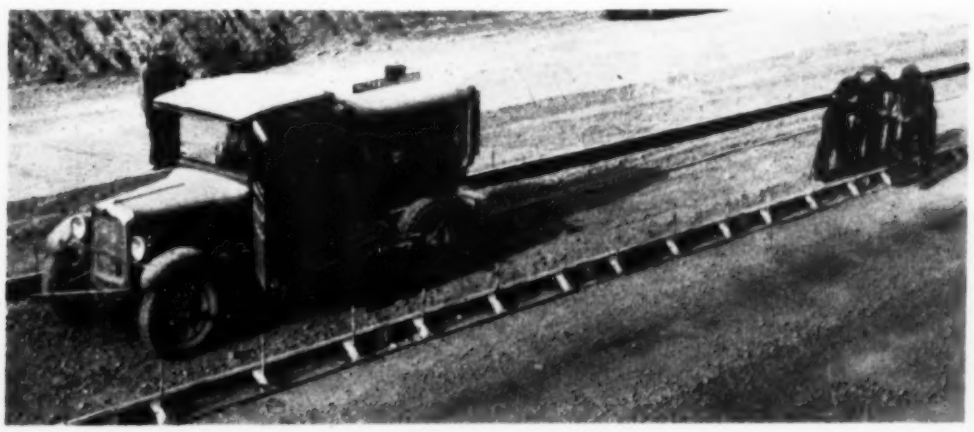
SLOPE TEMPLET checks bank behind auto grader on grading contract of Herman Holmes, Crystal Falls, Mich.



TIMBER TRIPOD equipped with ratchet-lever chain hoist (Yale & Towne) assists Holt, McConnell & Osburn, Cannonsburg, Pa., in placing concrete culvert pipe in trench.

PORTABLE VIBRATOR UNITS (Jackson and Master) powered by gasoline engines and equipped with flexible shafts running to vibrating elements are used to consolidate concrete in bridge structures on contract section of C. J. Langenfelder & Son, of Rosedale, Md.



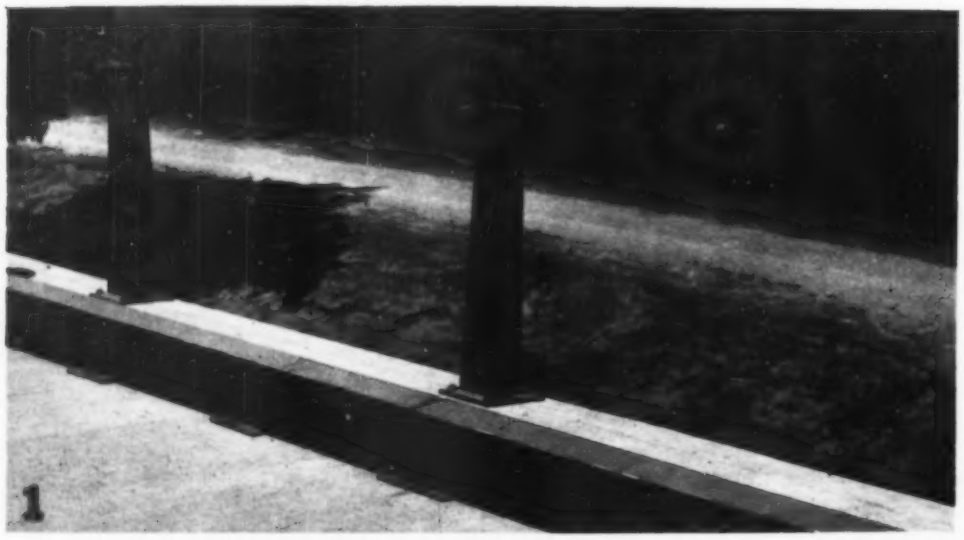


BIGGEST MONEY SAVER working ahead of mixer is what C. O. Albright, superintendent for Walker Bros., Chambersburg, Pa., on Turnpike's first paving contract, calls this jackhammer (left) driving form pins into compacted shale subgrade. Truck-mounted compressor (above) moves forward with pin-driving crew. (Ingersoll-Rand jackhammer and compressor).

Step-by-Step Field Methods

HOW SIX-MAN CREW DRILLS AND SETS 45 EXPANSION BOLTS AN HOUR

TO INSTALL 4,800 EXPANSION BOLTS in 1,900 lin. ft. of reinforced-concrete slab bridges without waste motion or loss of time requires advance planning and proper tools. Accompanying photographs show how one contractor organized a small crew to drill and set bolts rapidly with the aid of small power tools and hand tools.



FOR PURPOSE OF ERECTING GUARD RAIL POSTS and steel curb in manner roughly indicated by this temporary set-up, C. F. Keplogle, superintendent for Lewis & Frisinger Co., Ann Arbor, Mich., on contract involving 1,900 lin. ft. of overflow bridges for Ohio Department of Highways, puts to work six-man crew installing expansion bolts to anchor plates to which posts and curb will be welded.

BOLT CREW DRILLS HOLES FOR EXPANSION BOLTS with two jackhammers run by 220 cu.ft. per minute truck-mounted compressor. Two men ordinarily set bolts in drilled holes, and another fills cavities with sulphur, which is an optional filler material on this contract

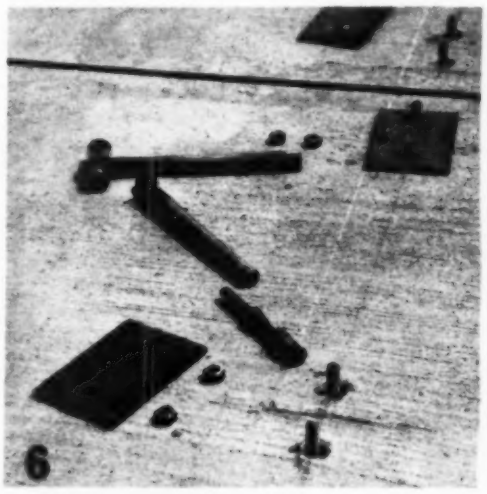
SIX-POINT DETACHABLE BITS, 1 ⅜-in. size, drill holes for ¾x9-in. expansion bolts and do well at job except when they come up against reinforcing rods in deck slab.

TO SPACE HOLES PROPERLY, drillers use steel plate templets and drill through holes in plates

FAST LOADING is in evidence at supply depot as bolt setter gathers armful to be distributed along deck.

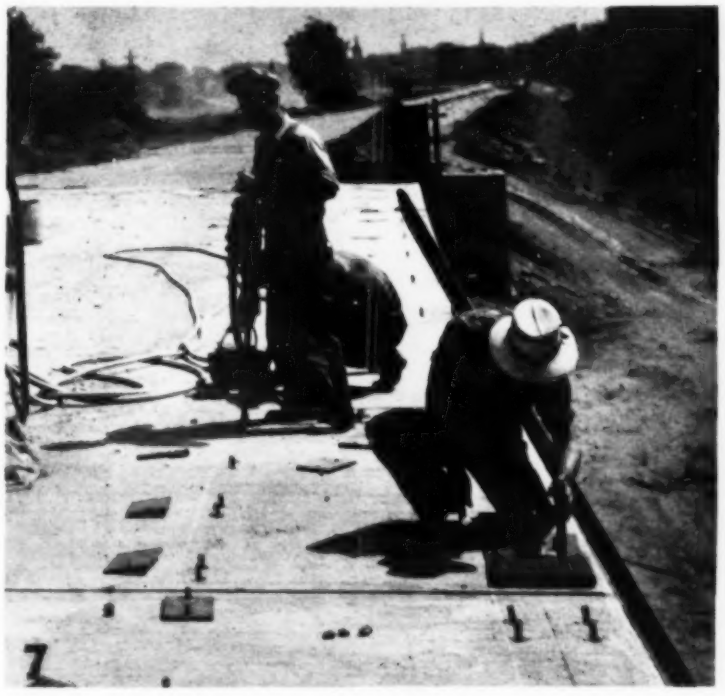
LIQUID SULPHUR pours from small ladle through metal spout into hole. Relatively constant volume of poured sulphur, with resultant freedom from shrinkage, causes contractor to favor this material for filling holes.

READY FOR DRIVING (right) (but not in position to be driven) expansion collar and tapered wedging ring on shank of expansion bolt can be seen plainly. Mechanic uses pipe follower and hammer to drive tapered ring into expansion collar. Bolts in foreground have been driven tight, and holes are ready for sulphur filler.



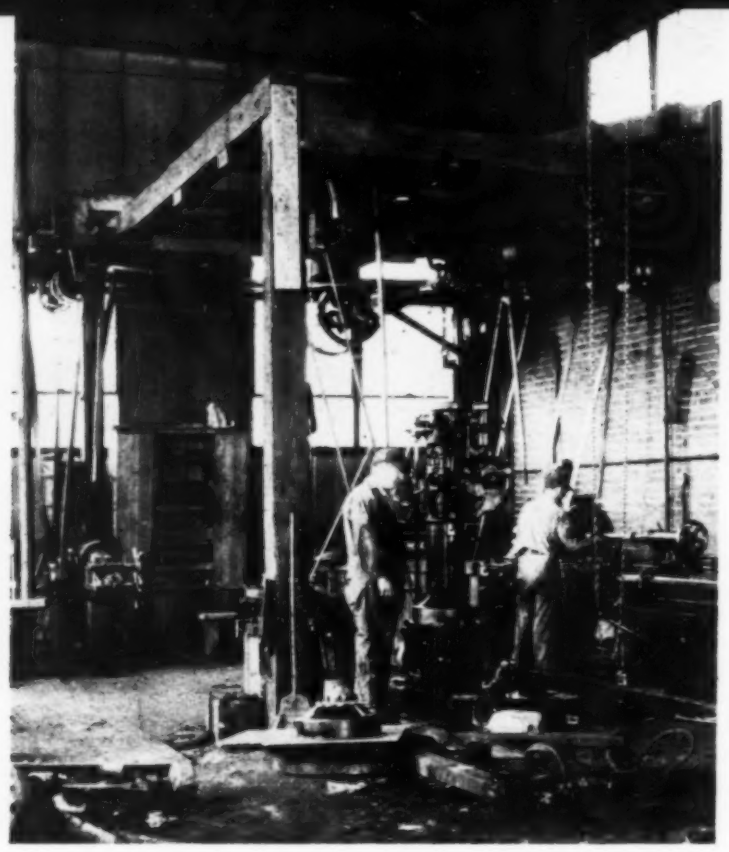
IMPROVISED WOOD - BURNING SALAMANDER (left) melts sulphur in iron pot for pouring with ladle into holes around expansion bolts. Sulphur melts at less than 250 deg. F.

USING PIPE AND HAMMER (below). bolt setter at right drives wedging ring into expansion collar of each anchor bolt as it is installed.



SIXTH MAN in crew sets plates on bolts and runs nuts down with long spud wrench which enables workman to stand erect. Equipped with twelve-point socket and crank handle, wrench made on job proves almost as cheap as air wrench or electric drill (fitted with socket) originally used for this work. Six-man crew drills and sets 400 to 500 expansion bolts in 10 to 12 hr.

ESSENTIAL TO BENCH WORK in any shop, vises (Reed) are used repeatedly by contractor's mechanics throughout the day.

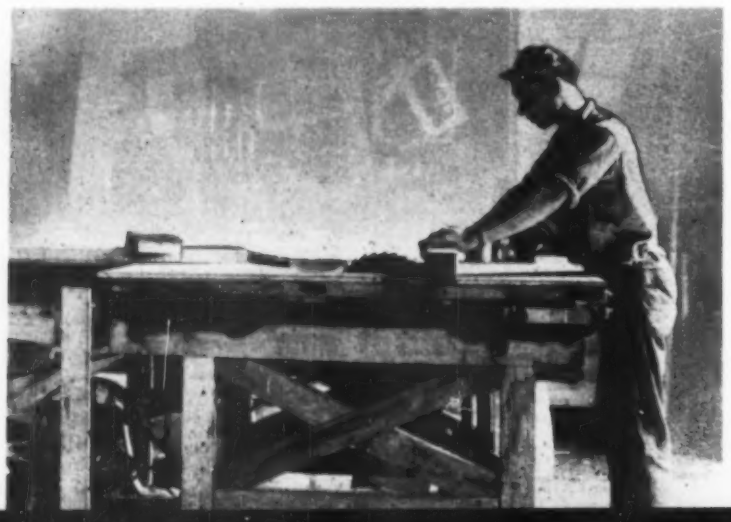


FIVE METAL-WORKING TOOLS, belt-driven off pulley shafts turned by one 15-hp. electric motor, make parts required for repairing and rebuilding construction machines. Tools include 24-in. by 12-ft. lathe (turning down shaft for power shovel), drill press, shaper, bolt and pipe cutter, and bolt and pipe threader.

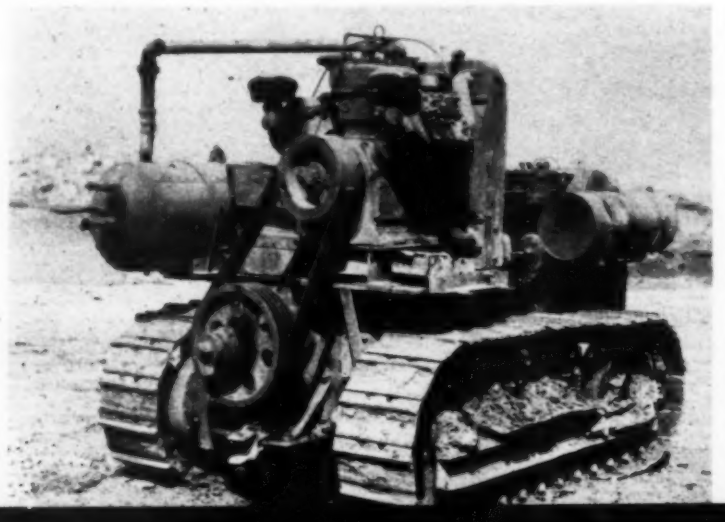
TO SHAPE AND SHARPEN CUTTING TOOLS, bench grinder (Queen City) driven by 1-hp. 220-v. electric motor is equipped with coarse and fine carborundum wheels.

SKILLED MECHANICS REDUCE REPAIR BILLS WITH *Power Tools*

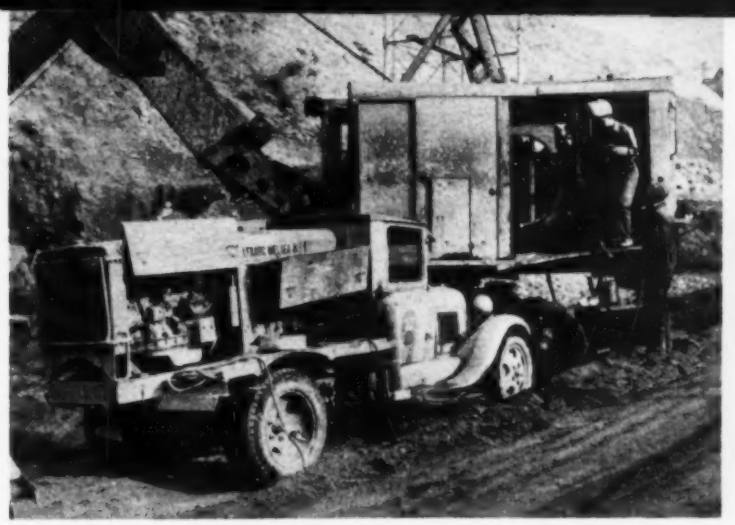
FOR ODD JOBS (below) such as this man is doing, power-driven saws in wood-working shop facilitate accurate cutting. Belt from circular saw (Briggs) is interchangeable with belt from band saw on pulley turned by 15-hp. electric motor, only one unit being operated at a time.



PRODUCT OF WINTER WORK (below) in contractor's shop is this mobile compressor unit which utilizes retired 60-hp. gasoline tractor (Caterpillar) as mounting and power plant for 210-c.f.m. compressor (Gardner-Denver) used to operate jackhammers at Ruch's Hill grading job.



FOR SMOOTHING WELDS and rough spots on metal work, mechanics use portable flexible-shaft grinder (Sioux) equipped with 7-in. abrasive disk driven by ½-hp. a.c. single-phase 3,450-r.p.m. electric motor.



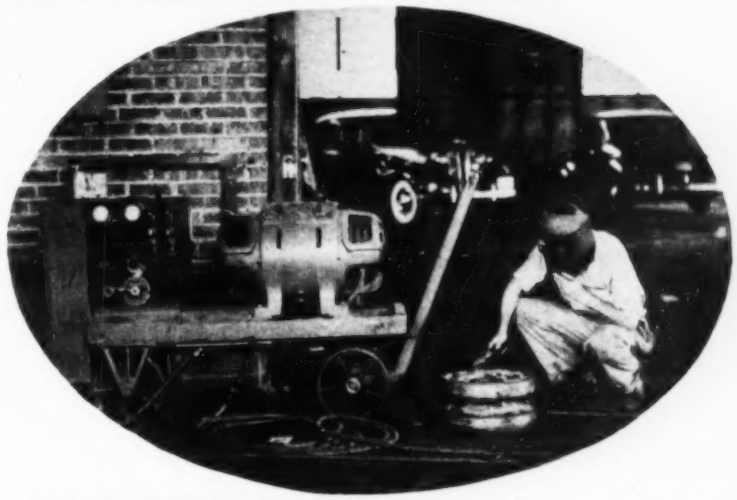
FOR REPAIRS ON JOB, contractor's mechanics at Ruch's Hill grading operation for Pittsburgh Housing Authority use truck outfit carrying 400-amp. 40-v. welding generator (Westinghouse) driven by eight-cylinder gasoline engine, and acetylene welding set (Airco). Operator is using coated electrode (Wilson) ¼ in. and 3/16 in., on this repair job.

SAVINGS AS HIGH AS 70 PER CENT ON EQUIPMENT REPAIRS accrue to the Harrison Construction Co., Pittsburgh, Pa., as a result of extensive power tooling of its shops at headquarters, on the city's North Side, and in the field. An ingenious master mechanic, backed up by a staff of capable job mechanices assigned to the firm's various construction contracts, replaces broken and worn parts at minimum cost and spends the off-season months in rebuilding and revamping scrap equipment to give continued economical service. The firm makes a practice of taking good mechanics and training them to be competent operators of construction equipment. When a breakdown occurs in the field, the operator frequently is able to make his own repairs. In case of major repairs, the operator works effectively with the job mechanics to put his machine in running order. Probably 80 per cent of the contractor's regular equipment operators were skilled mechanics before they learned to handle their tractors, shovels, mixers or finishing machines. On a construction job, these men work as mechanics when their machines are not operating.

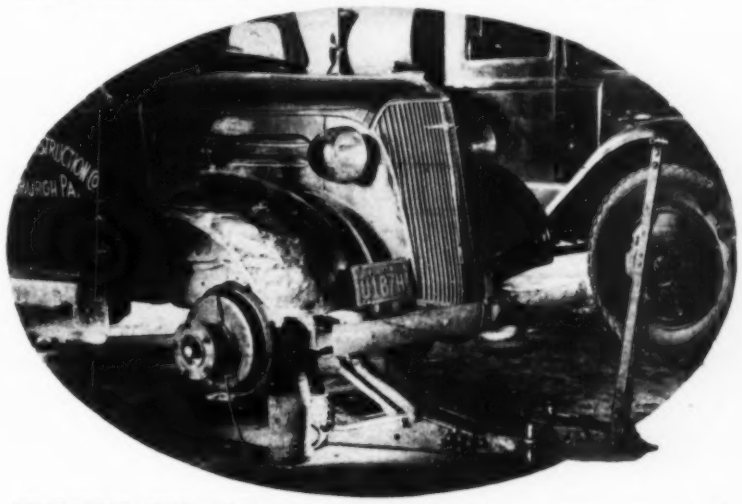
As shown by accompanying photographs, heavy metal work in the central shop is accomplished by a battery of five machine tools belt-driven from pulley shafts by one 15-hp. electric motor. These tools, picked up at moderate cost at a sale of used equipment, are adequate for the intermittent machine shop service required in a contractor's yard. For innumerable repair jobs beyond the reach of the machine tools, the contractor equips the central shop and field shops with a wide variety of portable, power-driven, hand-operated tools, some of which are illustrated here. With these tools, the mechanics are able to make all ordinary repairs without recourse to the central shops.

Maximum savings are obtained in replacing parts of heavy construction equipment. When parts can be built and machined entirely in the contractor's shop, the savings run close to 75 per cent. On replacements built in part by the contractor and machined by outside shops, the average saving is 30 per cent. In some cases, it is possible to get higher-strength steels than standard and still save 20 per cent.

At the head of the contractor's mechanical organization is Anthony (Tony) Magnifesto, master mechanic. All members of the Harrison Construction Co. unite in giving him credit for resourcefulness, ingenuity and all-around ability to keep equipment in good operating condition at minimum cost.

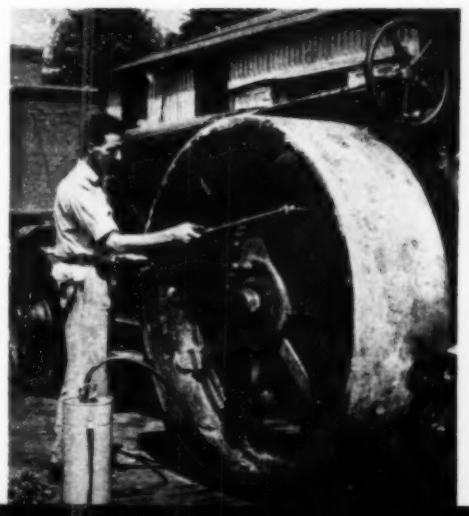


PORTABLE WELDING SET. (Una) sees service on practically every job brought into contractor's shop. Generator is rated 220 v., 300 amp.

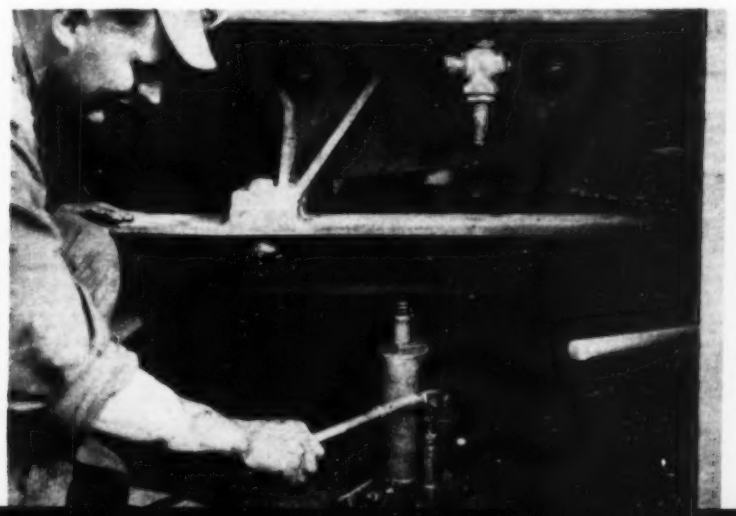


HYDRAULIC JACK (Walker) picks up truck axle to permit removal of wheels while repairs are being made.

HAND-PUMPED HYDRAULIC HOIST (below) (Blackhawk), raises frame under engine on power shovel while mechanics make repairs.

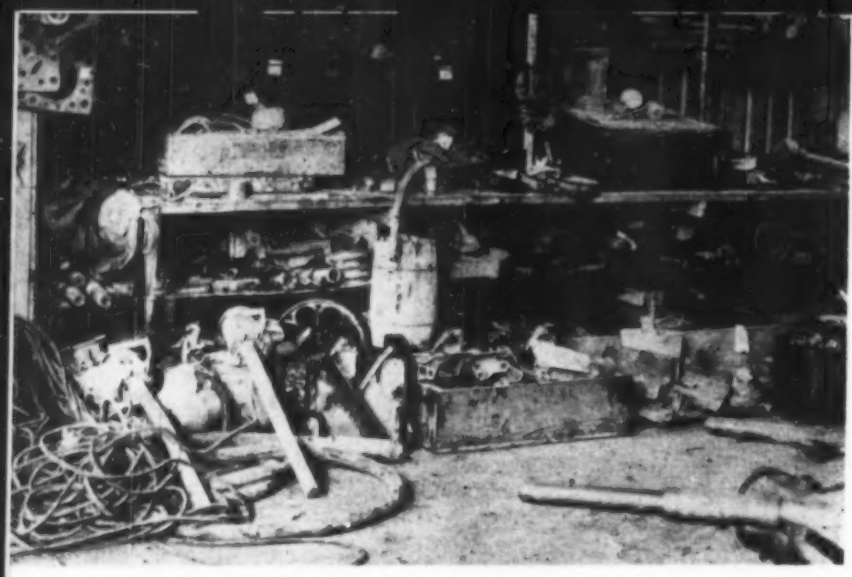


FOR CLEANING EQUIPMENT (right), hand-pumped pressure spray uses ordinary diesel fuel oil. To protect equipment which stands in open during winter, same apparatus (Myers Kwikfill) applies special oil designed to adhere through all conditions of weather.

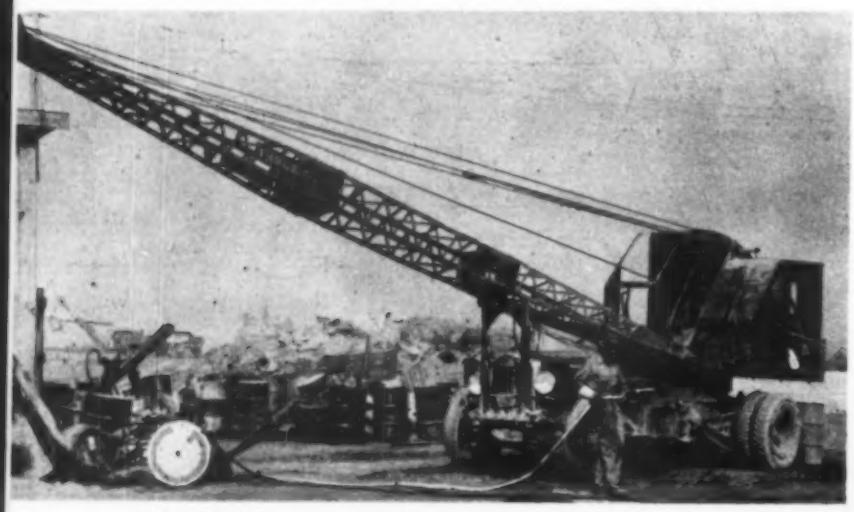


REDUCING REPAIR BILLS WITH *Power Tools*

(Continued)



IN YARD STOREROOM are four electric-motor-driven internal vibrators (Viber),—two small rigid-shaft units and two larger flexible-shaft type—returned from one job and stored temporarily while waiting to be sent to another.

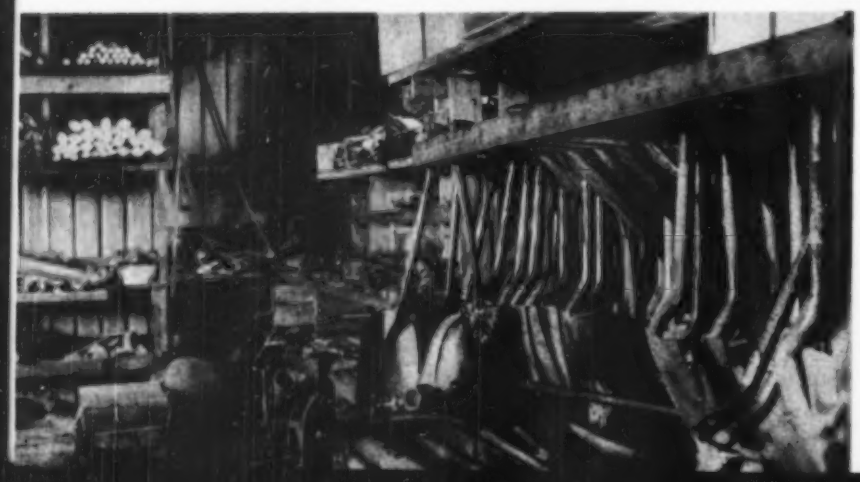


CLOTH TAPE measures length of preformed wire rope to be carried by truck crane (equipped with "headache pill") in readiness for time when re-reeving will be necessary.

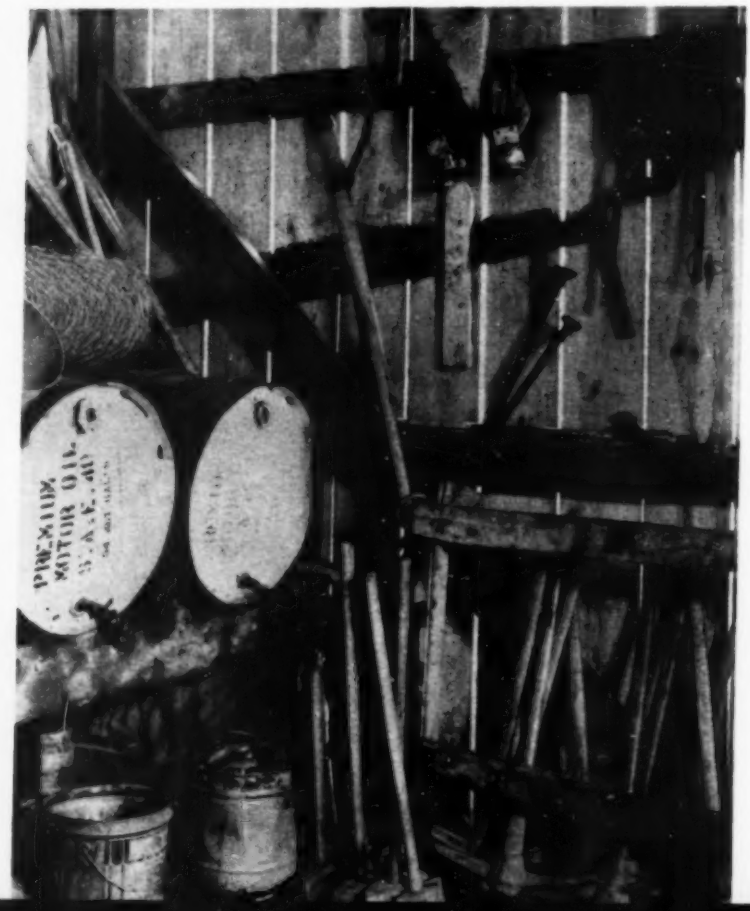
AFTER MEASURING proper length of reserve line for truck crane, operator cuts wire rope with gas torch using oxygen and acetylene fuel.

CONTRACTOR'S MACHINE SHOP is tooled to produce parts for repairs and replacements in construction equipment. Hand-operated overhead gantry crane (Cleveland) of 10-ton capacity lifts heavy pieces.

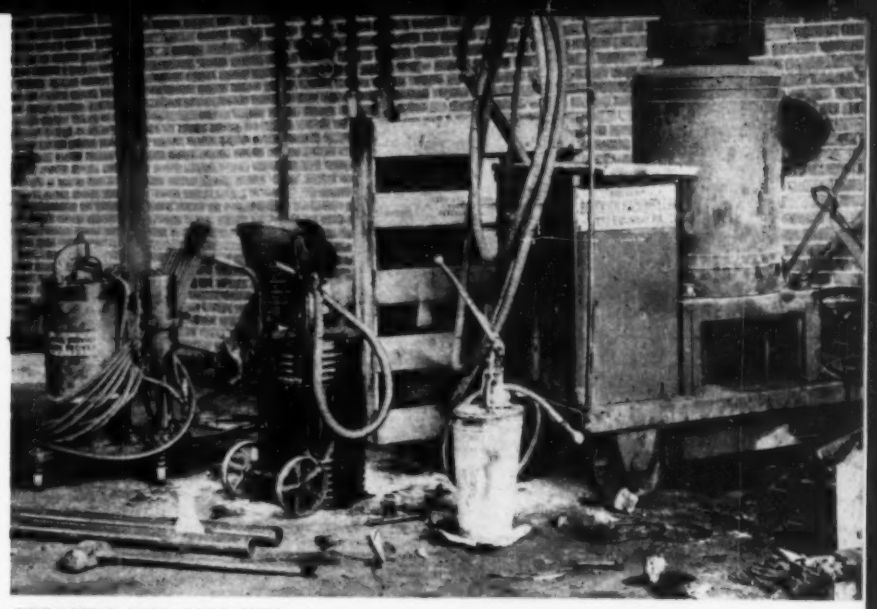
CORNER OF CONTRACTOR'S STOREROOM (below) shows small part of stock on hand in central yard during construction season, when several jobs have taken bulk of tools. (Two Duff and one Buckeye railroad jacks).



CROSS-CUT SAWS, peaveys, sledge hammers and picks **(below)** are few of essential small tools found in one corner of storeroom on job.

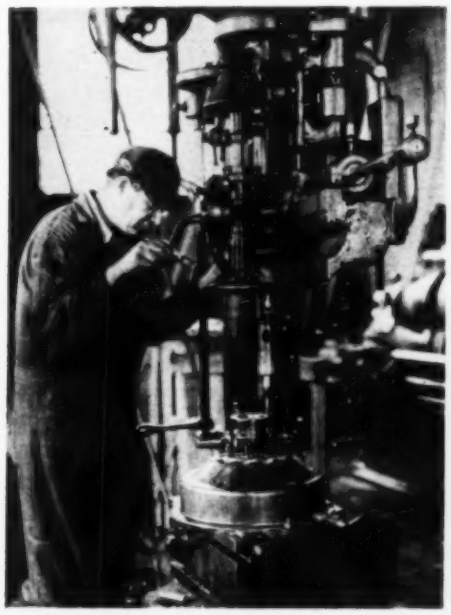


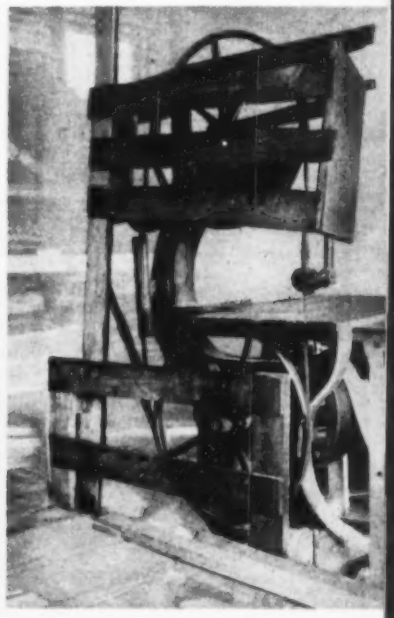
DRILLING HOLES for splice connection on steel member of ditching machine, mechanic operates ½-in. electric drill (Van Dorn) 110 v., 2.9 amp., which turns at speed of 375 r.p.m.



GREASING AND CLEANING of contractor's equipment are served by four units in this group. Lubricating devices are: (left to right) air-power volume greaser, (Cities Service); hand-operated grease gun inserted in can of special grease for transmissions and differentials; and hand-pumped volume compressor (Alemite) for greasing. Largest unit, at right, is high-pressure jenny (Homestead) equipped with automatic electrically controlled kerosene burner and charged with cleaning solutions to cut mud and grease.

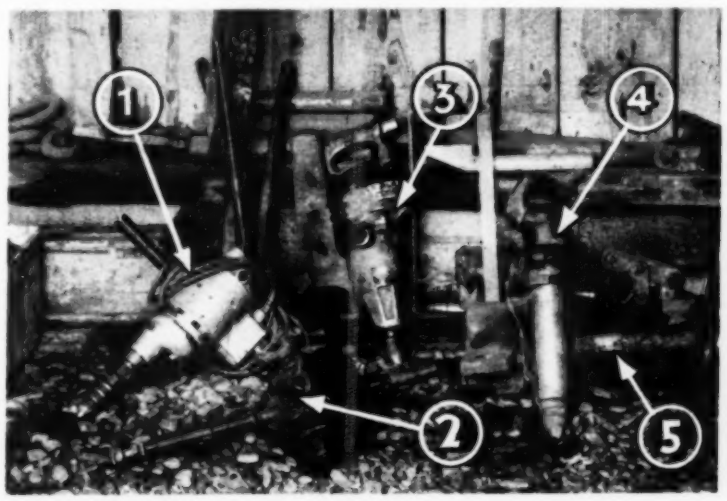
TWO SETS OF SOCKETS operated by ratchet wrenches (Snap-On) assist N. T. (Whitey) FRANKLIN, job mechanic, and his crew in making equipment repairs. Ruch's Hill grading job, $460,000 contract, has eight mechanics working on two shifts. Tools shown represent investment of nearly $200.





FOR DRILLING AND REAMING machine parts **(left)**, drill press (Cincinnati-Bickford), saves mechanics' time and speeds completion of repair jobs. **DRIVEN BY BELT** from same pulley as circular saw **(right)** two belts can be interchanged when carpenters use band saw. (Cordesman, Egan)

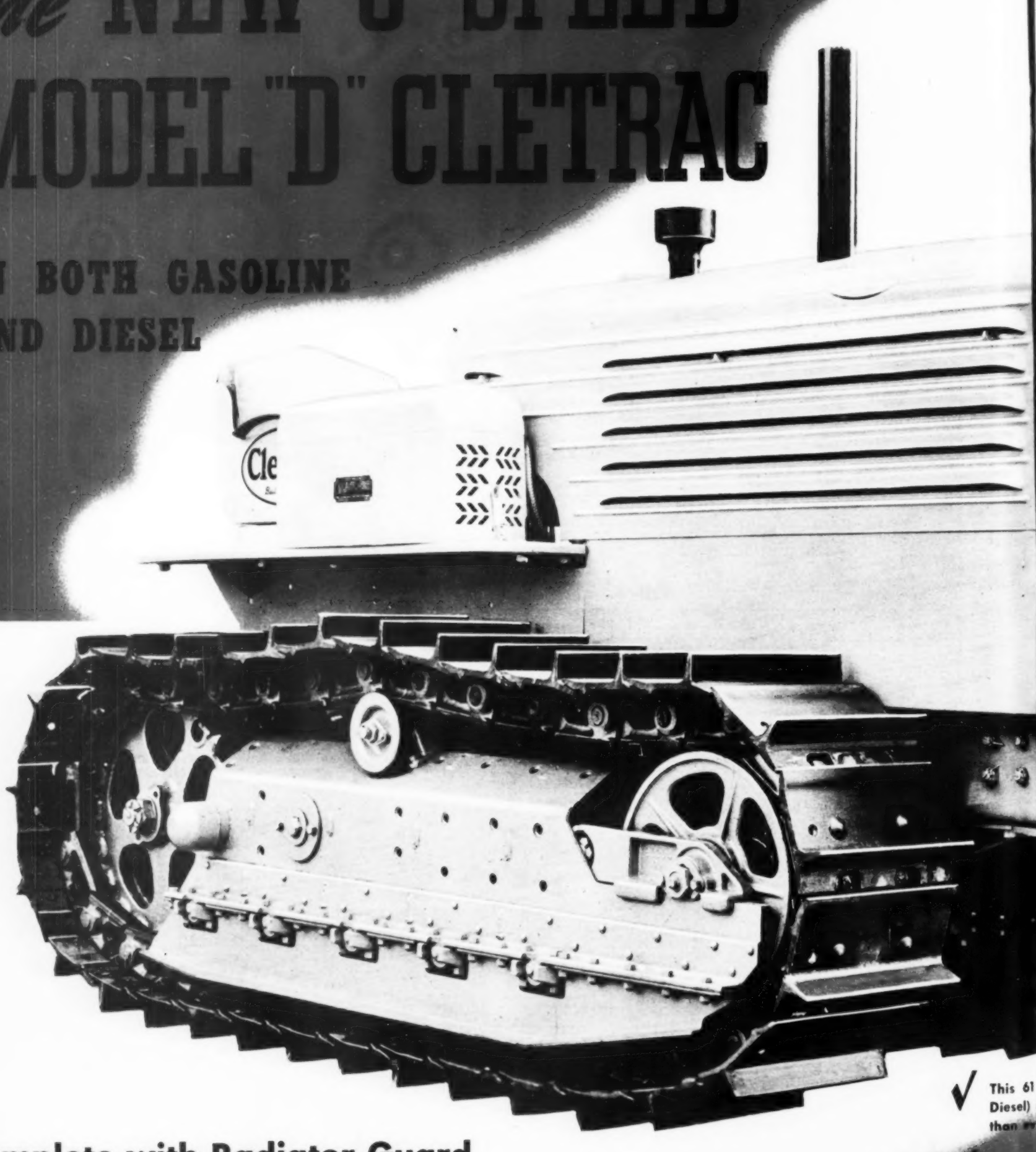
POWER TOOLS (below) in job shed serve mechanics in making repairs and replacements at site. Left to right: (1) U.S. electric drill; (2) Thor air-powered drill; (3) Chicago Pneumatic air wrench and (4) pneumatic riveting hammer leaning against (5) Caterpillar hydraulic press used for such purposes as pulling final drive sockets and pressing track pins in tractors.



HORSES MAY BE OBSOLETE (below) on construction jobs, but blacksmith shop well stocked with tools still earns its keep in contractor's yard

The NEW 6 SPEED MODEL "D" CLETRAC

IN BOTH GASOLINE AND DIESEL



Complete with Radiator Guard

Crankcase Guard...Hood Panels...Electric Starting

***These are all* STANDARD EQUIPMENT *on the* CLETRAC...Nothing extra to buy.**

✓ This 61 H.P. T
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✓ First, the
reverse —
starting

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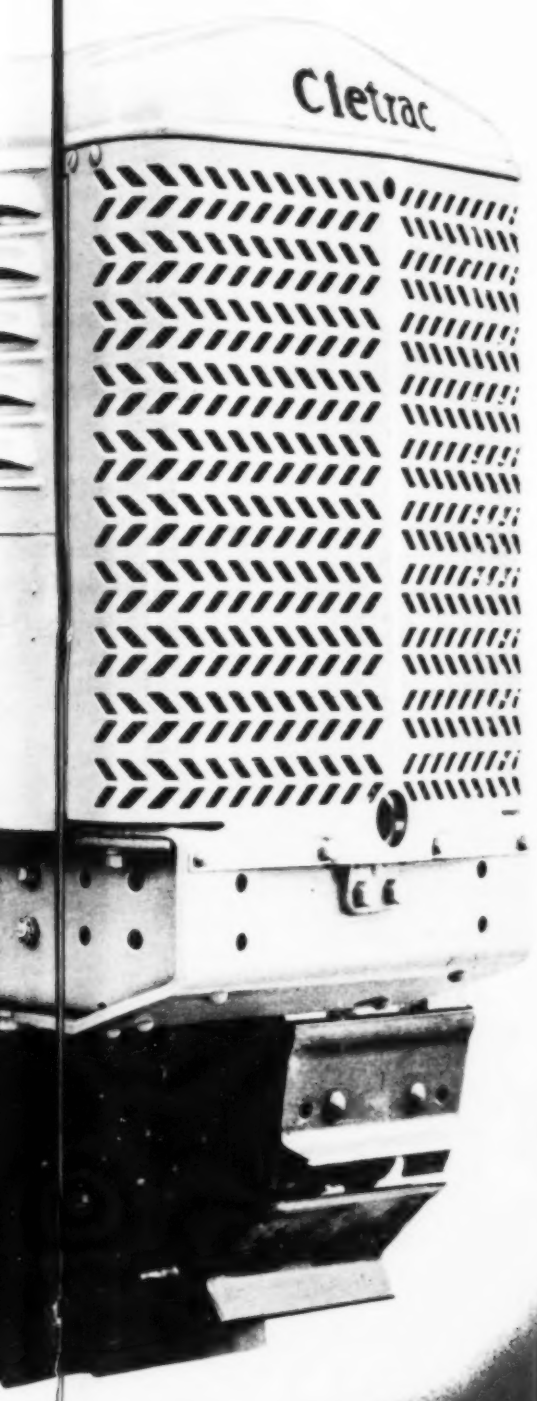
61 HORSEPOWER ON DRAW BAR

OPERATING WEIGHT 14,000 LBS.



How Ready . . . for YOUR Job!

SPEED UP YOUR OPERATION . . . Why lose time and money on long hauls? Use a speed to fit your job—you can get it in the new six-speed Cletrac Model "D."

is 61 H.P. Tractor (either gasoline or esel) can now do more work in a day an ever before — and keep on doing it.

t, there are 4 forward speeds and 2 erse — 1.71 miles per hour low for rting heavy loads . . . a 2.5 miles per hour second . . . a 3.1 miles per hour third with 7,600 pounds drawbar pull and a 5.3 miles per hour high with plenty of power to move heavy loads at this speed.

✓ Then there is a heavier, stronger, one-piece drop forged track shoe and tougher, rolled steel integral plate and grouser which is interchangeable and renewable.

✓ These are but a few of the many features that make this new Cletrac Model "D" a "natural" for contractors. Do you want to know more about this new "D"? Write (or wire collect) to:

CLEVELAND TRACTOR CO. • • • CLEVELAND, OHIO

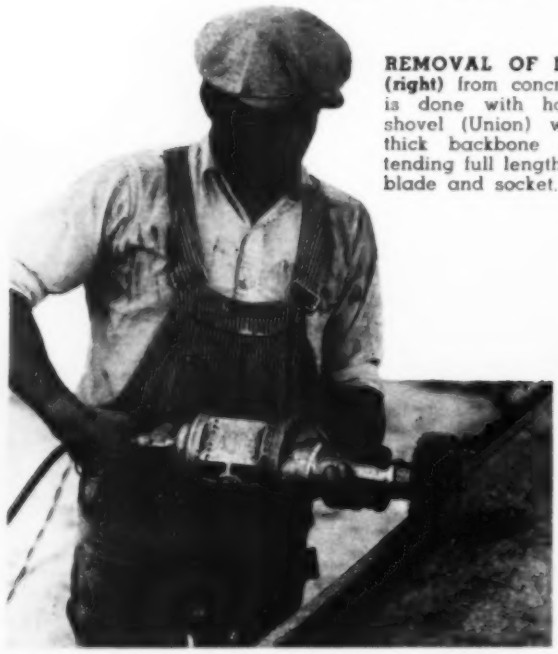
Small Tools on

GRAND COULEE

ON FILLET OF DAM, under construction by Consolidated Builders, Inc., chipping gun (Ingersoll-Rand) is powered by compressed air delivered by rubber hose line.

WASH AND DRAIN WATER are removed from concrete blocks of dam by portable sump pump (Ingersoll-Rand).

HEATING OF RIVETS for erection of tall steel trestle from which concrete is poured is done in forge (Champion) on which blower, equipped with adjustable ball bearings and high speed spiral gearing, is operated by hand crank.



CLEANING OF CONVEYOR BELT, preparatory to repair, is done by portable electric grinding tool (Black & Decker) equipped with wire brush.

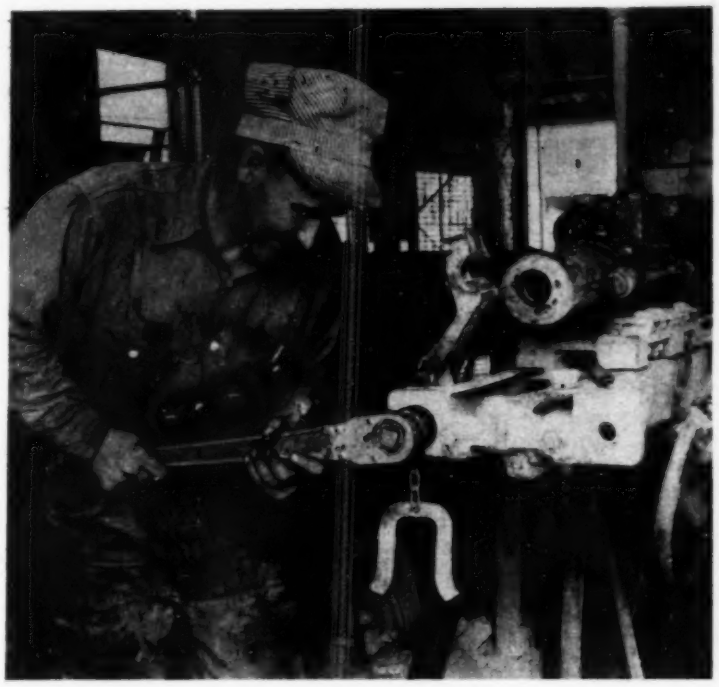
REMOVAL OF ICE (right) from concrete is done with hand shovel (Union) with thick backbone extending full length of blade and socket.

REPAIRS TO CRAWLER TREADS (below) of big electric power shovel involve use of adjustable wrench (Crescent) and mechanic's hammer (Zenith).

FOR FINISHING CONCRETE SURFACES (below) of dam, variety of hand tools (Marshaltowne) are used.

Big Dams

SHASTA DAM



IN SHOPS of Pacific Constructors, Inc., mechanic finds ratchet wrench (Blackhawk) handy tool on repair of wagon drill.

CUTTING OF 2x12-IN. LUMBER for sand and gravel hopper is done by carpenter using portable electric saw (Skilsaw).

VIBRATION OF FORMS (below) for concrete track hopper to receive aggregates is accomplished with pneumatic chipping hammer (Ingersoll-Rand).

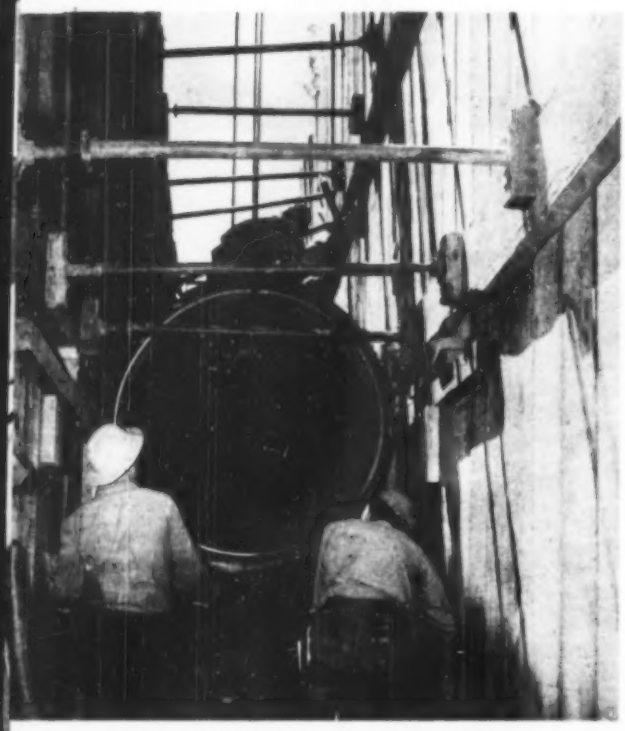
PEENING DOWN OF WELDED BEAD on idler rim of big power shovel is done with chipping hammer (Ingersoll-Rand).

DRESSING DOWN (below) of piece of plow steel to reinforce lip of bucket is handled by grinder (Ingersoll-Rand) air-operated and equipped with abrasive wheel.

TURBINE SAW suspended by vertical arm from overhead mounting cuts lumber used at East Coachella tunnel.

HEAVY TIMBER is handled by loggers' pikes at Parker dam on which J. F. Shea Co. was subcontractor for Six Companies Inc.

STEEL REINFORCEMENT for concrete lining on upstream face of Cajalco dike, Griffith Co. job, is cleaned by sand blasting.



TRENCH BRACES hold timber sheeting in trench for pipe line on Palos Verdes feeder, J. F. Shea Co. contract job.

AQUEDUCT CONSTRUCTION MAKES VARIED USES OF *Small Tools*

THE ACCOMPANYING ILLUSTRATIONS indicate the wide range of small tool applications on the 242-mi. long main line of the Colorado River aqueduct in California, nearing completion by the Metropolitan Water District of Southern California, the source of the photographs on these pages. Construction was done both by contract and by day labor with the District's own forces, under the general direction of F. E. Weymouth, general manager and chief engineer.

RATCHET JACKS (below) in horizontal position, bearing against short lengths of rail in front of headers anchored along invert, shove heavy sections of precast concrete pipe into place on Little Morongo siphon.

JACKING OF PIPE (below), carries Palos Verdes feeder line of Metropolitan Water District's distribution system underneath railroad crossing.

FIELD JOINT (below) in pipe line is polished by rotary wire brush on air-driven portable drill prior to placing gunite covering.

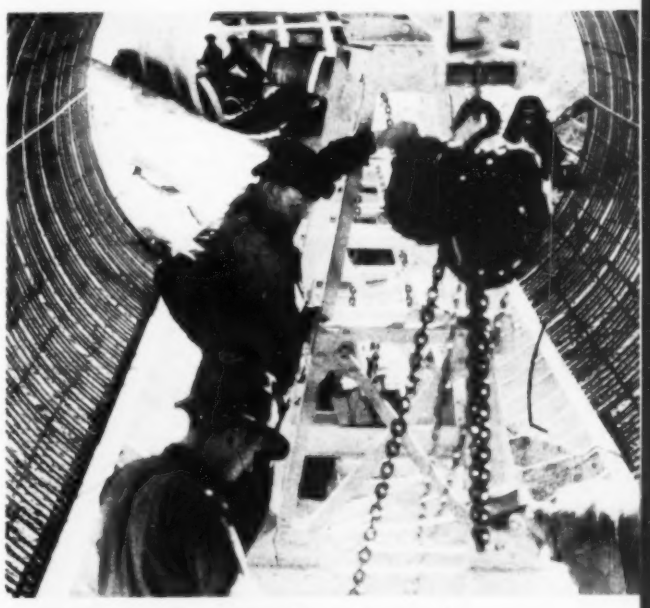
WIRE STRETCHERS tighten mesh reinforcement prior to application of Gunite on 10-ft.-diameter steel pipe line for upper feeder of distribution system.

PLIERS prove to be useful tools in installing barbed-wire fencing around Hayfield reservoir.

HAND SHOVELS of molybdenum steel aid crew on ballasting of track in San Jacinto tunnel.

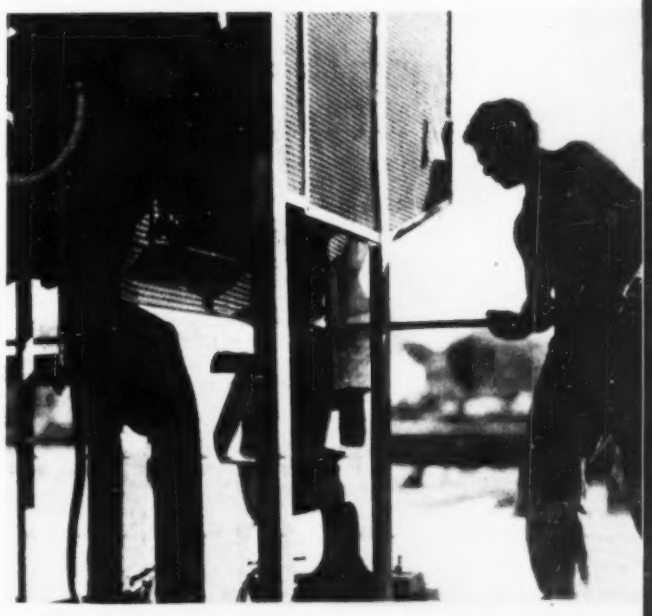
FOR MUCKING OF HEADING (left) in pipe being jacked under railroad crossing, construction crew uses pneumatic-tired wheelbarrow.

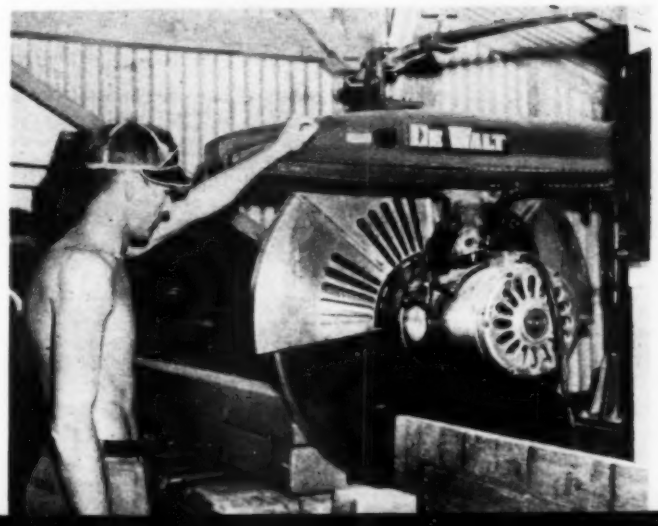
CHAIN HOIST (right) is handy tool for setting forms for Fan Hill siphon.



LONGITUDINAL JOINT (left) in concrete lining of Monrovia tunnel No. 3, West Construction Co. job, is finished by grinding with abrasive disk on electric drill.

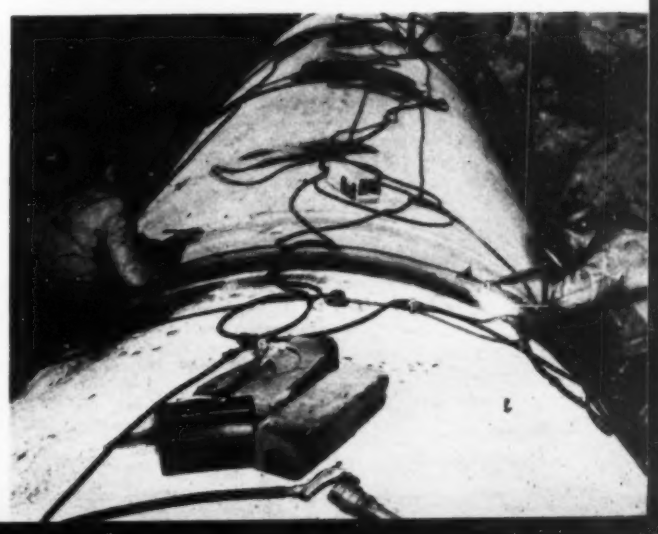
CUTTING OF REINFORCING BARS (right) is done with this power tool at East Coachella tunnel.





CUTTING OF LUMBER (left) for timbering in San Jacinto tunnel is done by big circular saw (DeWalt) powered by electric motor.

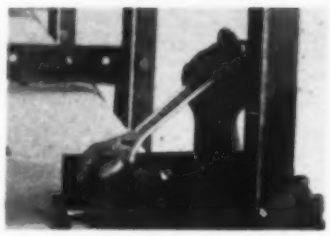
FIELD WELDS (right) of joints in large steel pipe lines are finished with aid of air-operated chipping hammers.



SMALL TOOLS ON WRENCHES CONSTRUCTION

1

1 DRIVING OF LAG SCREWS into railroad ties, to hold track plates, is accomplished by electric drills (Black & Decker) receiving current from portable generator set.



2

2 TO SET BOLTS on concrete bridge approach this adjustable wrench (Williams) of high-strength alloy steel proves to be handy tool.

3

3 ADJUSTABLE JAWS and locking device are feature of this vise-grip wrench (Petersen). End screw is turned to regulate jaws for close fit over work. Then lever is shut and jaws clamp down on work with hold that will not slip.

4

4 FOR FABRICATING STRUCTURAL STEEL electrically-powered nut runner (Black & Decker) simplifies making of bolted connections between numbers.

5

5 REMOVAL OF BOLTS prior to riveting of structural member in steel fabricating shop is done by impact wrench (Ingersoll-Rand) operated by compressed air delivered by hose line.

6

6 RATCHET WRENCHES are convenient and time-saving tools for installing Dresser couplings on steel pipe lines.

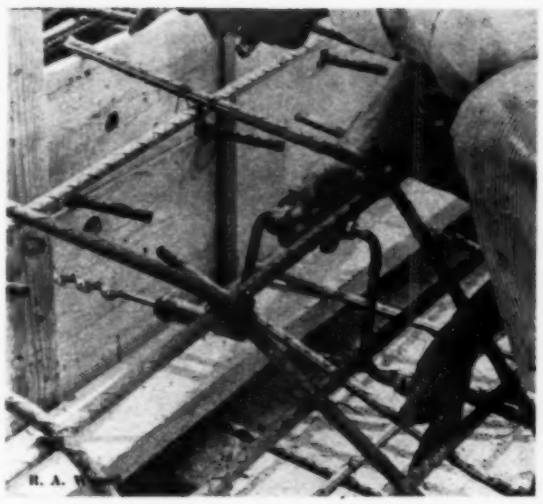
7

7 BIG LONG-HANDLED WRENCH of reversible ratchet type (Lowell) is employed effectively in close quarters to turn nut on threaded rod in connection with reconstruction of railroad bridge. Wrench handle first is located in easiest position for operator; then nut is "pumped" home safely, without removing wrench from it. Ratchet mechanism involves two straight pawls set in solid stock of handle where they rotate.

8

8 PIPE LINE JOINT is bolted quickly with aid of rotary wrench (Chicago Pneumatic) operated by compressed air.

SMALL TOOLS ON DRILLS CONSTRUCTION



1

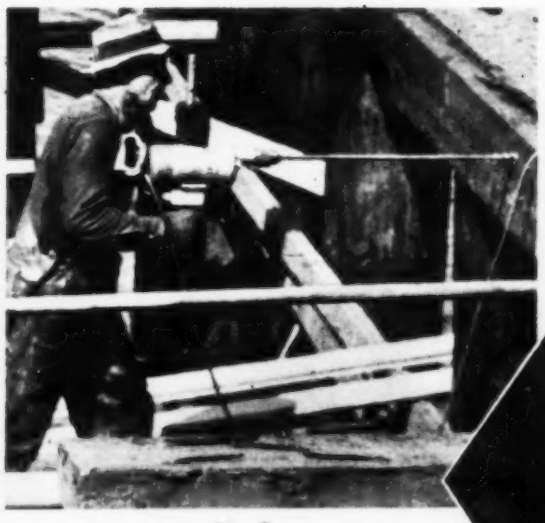
1 BORING OF HOLES through wood forms is done by brace and bit (Irwin Clinton) on ramp approach to bridge

2

2 LIGHT-DUTY DRILLING is done by electrically powered tool (Mall) of ¼-in. hole capacity.

3

3 FOR SUPPLYING ELECTRIC CURRENT to portable drills, saws, augers and other hand tools on bridge repair job here is compact, gasoline-powered generator unit (Homelite), of 2,500-watt rating, which can be moved about readily, as needed, to various parts of work



4

4 PIER AND BULKHEAD CONSTRUCTION always requires boring of many holes for bolting heavy timbers; a job made easy by heavy-duty electric drill (Stanley) operating long ship auger

5

5 ANGLE DRIVE ATTACHMENT on this portable electric drill (Black & Decker) simplifies operation of forming holes in timber joists of frame building

6

6 RIGHT-ANGLE REAMER enlarges hole in structural steel member to 1 1/16 in. on viaduct job. Portable unit (Chicago Pneumatic) is powered by compressed air.

7

7 WOOD BORING on construction projects can be done effectively with compact portable electric tool (Skilsaw). Recent improvements in drill motors make it possible to drill hole with this size tool through thickness of timber illustrated

SMALL TOOLS ON VIBRATORS CONSTRUCTION

1

1 **GAS ENGINE POWER UNIT** of 3 hp. on pneumatic wheel mounting serves 2⅜-in. diameter internal vibrating element (Mall), with flexible shafting, for consolidating concrete at pavement slab joint.

2

2 **THOROUGHLY PUDDLED.** This view shows appearance of concrete in forms few seconds after internal vibrator (Jackson) had been inserted into freshly placed batch.

3

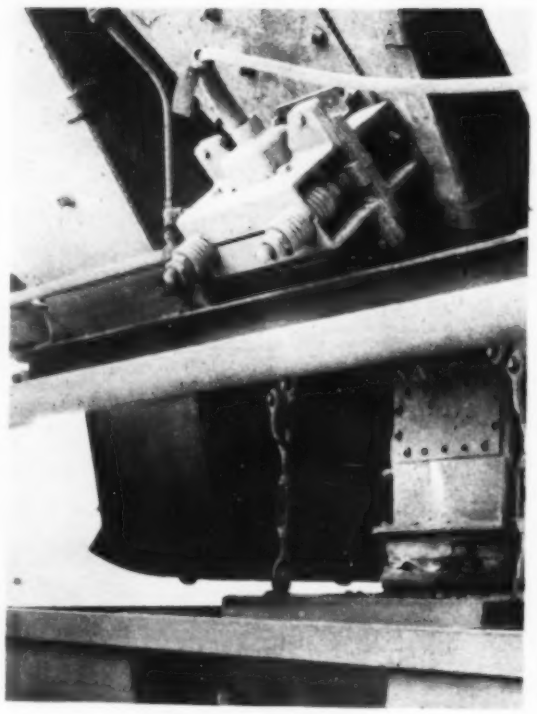
3 **PRECAST CONCRETE PILES** for pier construction, heavily reinforced with steel bars and hoops, are poured in horizontal wood forms. Dense concrete is assured by use of internal vibrator (Viber), a rigid electric unit powered by ½-hp. motor, easily handled by one man.

4

4 **MOBILITY** is feature of this vibrator and gasoline engine power unit (Master Vibrator) which is readily shifted by one man to points of use on housing job.

5

5 **ON CONCRETE RETAINING WALL** this vibrator (Berg) is powered by small electric motor slung from shoulder of operator by strap and comfortable pad. Portability is feature of this machine, weight of which is reduced by aluminum die castings.



6

6 **ATTACHED TO CEMENT HOPPER** of concrete batching plant this vibrator (Syntron) assures fast, free, uniform flow of material into weighing bins. Shaking of sides of hopper prevents arching or sticking of cement and speeds production of concrete on highway bridge project, for which concrete mixing plant is mounted on barge.

7

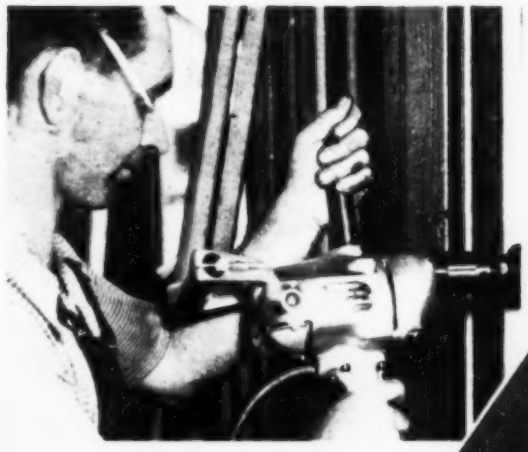
7 **POURING OF CONCRETE** into plywood wall forms for factory building is followed by internal vibration with 3-in.-diameter head (White) powered through flexible shafting by portable, air-cooled gasoline engine. Sensitive governor maintains constant vibration frequency.

SMALL TOOLS ON CONSTRUCTION SAWS

1

2

3



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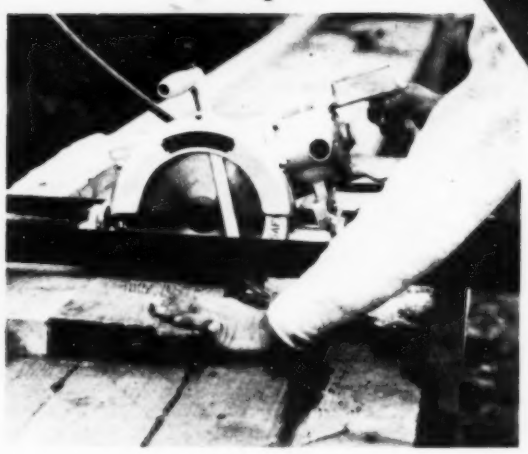

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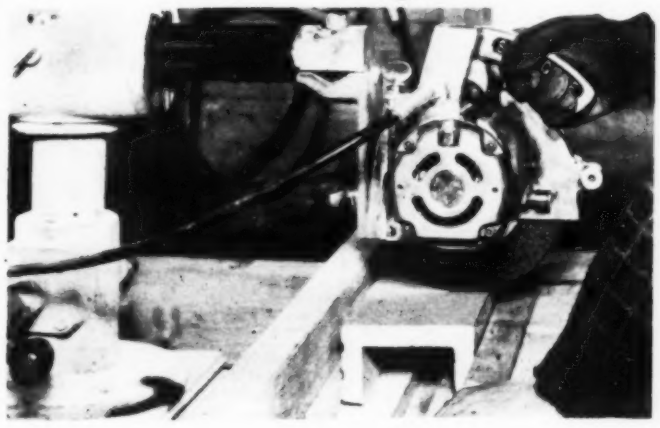
6



7

1 TRIMMING OF SIDING around window and door openings is done readily with electric saw (Skilsaw) without necessity of pre-cutting to exact lengths.

2 TILTING ARBOR SAW (Delta) handles cutting of lumber on building job. Self-contained, electrically powered unit, has table 20x27 in., without side wings, and will handle work up to 48 in. wide and 3⅛ in. thick. Saw blade can be tilted 45 deg. by hand wheel; second hand wheel raises and lowers blade.

3 FOUNDATION PILING is cut off by portable timber saw (Reed-Prentice) available in electric or air-driven models. Frame carries track on which continuous saw chain travels. Upper section of saw teeth has safety guard which passes through cut with saw.

4 HOLE IN PARTITION, to accommodate pipe, is quickly drilled with portable electric tool (Black & Decker) equipped with hole saw.

5 TO CUT HEAVY LUMBER to size, safety saw (Stanley) is operated on improvised saw frame. Portable electric tool has capacity of 3¼ in. thickness of cut.

6 MULTI-PURPOSE RADIAL ARM provides mounting for electric saw (Mall) used to rip large pieces of lumber. Saw has swivel base, safety guard, sawdust blower and rip fence guide. Radial arm with 28-in. travel, is effective for bevel and straight cuts, mitering and rippina.

7 ABRASIVE WHEEL on electric hand saw (Porter-Cable), mounted on radial arm, offers means of scoring hard-faced, vitrified tile on large sewer construction project. Wheel operates at 6,000 r.p.m. Radial arm facilitates cuts at angle and can be locked in any position.

SMALL TOOLS ON PIPE TOOLS CONSTRUCTION

1 **CHAIN VISES** (Armstrong) light and compact enough to go to job in tool bag, have capacity for even very large pipe. Wheels of cutting tool now have thin blades of alloy steel with knurled, rather than smooth edges.

1

2 **PIPE BENDING EQUIPMENT** of two types (Greenlee and Watson-Stillman) is employed on this tunnel approach job.

2

3 **CHAIN PIPE WRENCH** of double-jaw type (Billings & Spencer) is adapted particularly to turning of pipe for welding in oil fields.

3

4

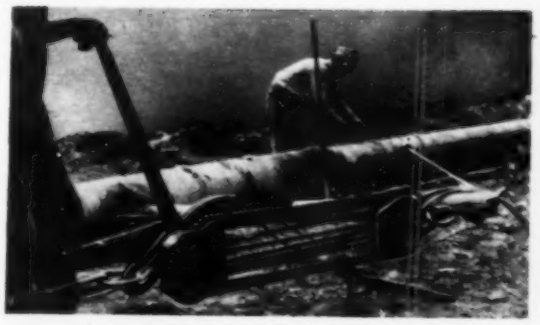
5 **ALLOY STEEL DIES** with "backed off" and ground teeth make threading 2-in. pipe one-man job with this tool (Armstrong).

5

6 **FOR THREADING ⅓-IN. PIPE** construction mechanics find this three-way Triad stock (Nye) handy tool in ½-¾-1-in. combination with dies. Feature of stocks, both three-way and ratchet, is that dies may easily be reversed, with ceiling bushing (guide) inserted, enabling operator to thread short nipple in emergency or, on repair work, thread up close to wall or ceiling.

6

SMALL TOOLS ON HOISTS CONSTRUCTION



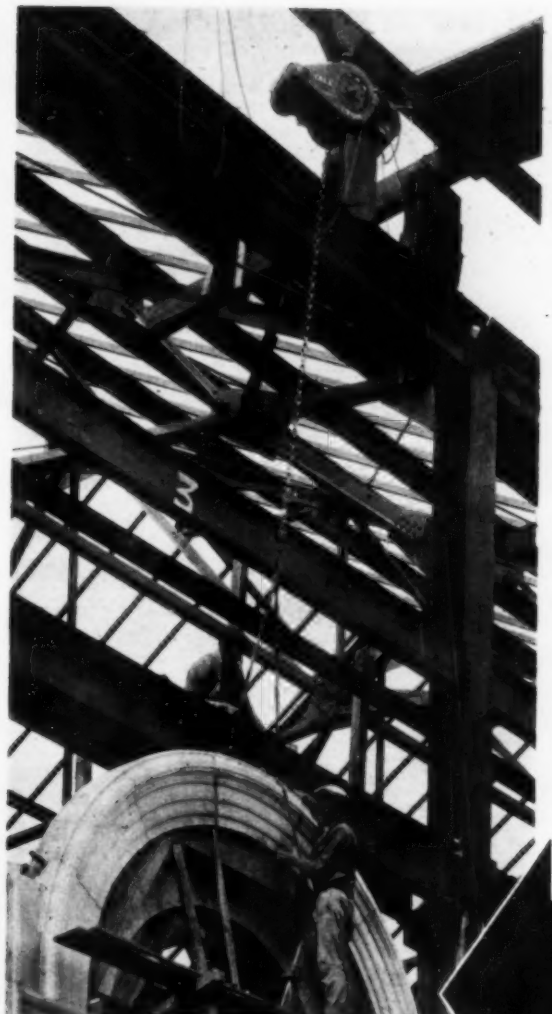
1

1 BENDING OF PIPE LINE is made easy by use of 15-ton ratchet lever hoist (Coffing) which has lifting speed of 6 in. per minute and lift of 5 ft. Net weight of tool is 150 lb. Load is always locked by sprocket and ratchet pawls and cannot drop or slip. Automatic stops prevent handle from spinning.

2

2 AIR-MOTOR HOIST (Ingersoll-Rand), hung from traveling gantry, enables large diameter pipe to be transported and set accurately.

3 DIFFERENTIAL CHAIN HOIST (Wright) is a piece of equipment widely used by contractors for setting water or sewer pipe accurately in trenches.



4

3

5

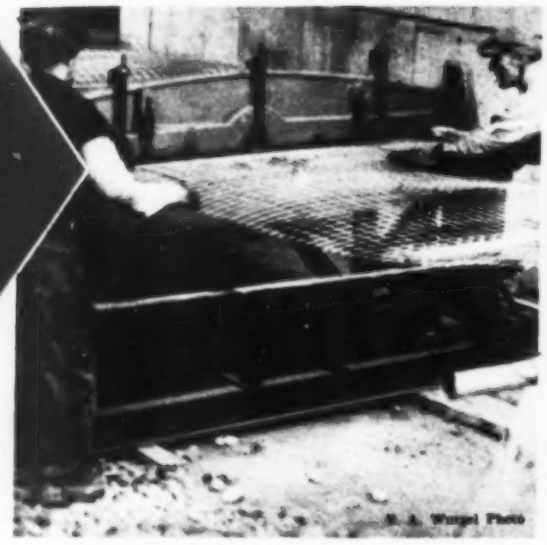
4 TROLLEY TYPE CHAIN HOIST (Yale & Towne) is used to set stone facing accurately on government building.

5 LIFTING OF PIPE LINE is accomplished by use of safety-pull hoist (Coffing) of ratchet lever type. Its capacity is 3 tons. Has free chain for quick load hook up or down adjustment when there is no weight on hoist. Reversible handle permits operating hoist in any position.

6

6 FOR LOWERING SUBAQUEOUS PIPE LINE to prepared foundation a battery of hand-operated all-steel 5-ton hoists (Beebe) was placed on timber trestle and slacked off simultaneously.

SMALL TOOLS ON CUTTERS CONSTRUCTION



2

1 **WIRE MESH REINFORCEMENT** for concrete at tunnel approach is unwound from reels and cut to proper lengths by wide-blade machine (Robinson).

2 **STEEL BARS** for concrete reinforcement and other uses at Ross dam in Washington are cut by hand-operated shear (Edwards).

3 **ANGULAR CUTTER** has cutting edges offset 30 deg. which enables operator of tool (Porter) to cut steel form rods flush with adjacent concrete surface without interference of head assembly straps.

4 **SHEAR CUTTER** is designed for use on wire rope, strip or flat bar stock. Blades of tool (Porter) pass each other in true shearing manner and cut without crushing action.

3

4

5

SMALL TOOLS ON GRINDERS CONSTRUCTION

5 **CONCRETE SURFACE GRINDER** smoothes surface of bridge abutments. This tool (Thor) is operated through hose line by compressed air.

6 **SMOOTHING AND POLISHING** concrete surface of retaining wall on highway project is done by air-operated grinder (Chicago Pneumatic).

7 **RIGHT-ANGLE HEAD** on this concrete surfacer (Berg) enables operator to remove form marks, fins and rough spots from wall. Powered by flexible shafting from electric motor strapped to worker's shoulder.

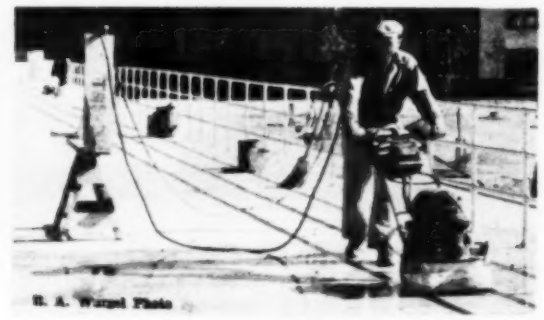
8 **PORTABLE POWER PLANT** in form of 3-hp. gasoline engine (Mall serves this concrete surfacer through flexible shaft drive and can also be used to operate concrete vibrator. Grinding disk can be run at speeds as low as 150 r.p.m. or at higher speeds.

9 **SIDEWALK FINISH** on grounds of newly completed airport is handled by this electrically operated grinding machine (Gavicci).

6

7

8



9

SMALL TOOLS ON HAMMERS CONSTRUCTION

1

1 FOR REMOVING RIVETS AND BOLTS, punching holes, driving studs, and for marine construction and emergency repair, this velocity-power tool (Mine Safety Appliances) utilizes pressure created by burning of sealed charge of smokeless powder. Can be operated under water as cutter, expander or driver.

2

2 FOR PLACING REFLECTORS along edges of superhighway, to minimize hazards of night driving, holes are drilled in concrete pavement by portable electric tool (Stanley). Reflectors are installed every 30 ft. on tangents and at closer intervals on curves.

3

3 TAMPING OF EARTH FILL is accomplished by portable gasoline hammer (Barco) in which impact is created by explosion in air-cooled cylinder.

4

4 FOR CHIPPING CONCRETE from brick wall, portable electric hammer (Black & Decker) is speedy, effective tool. Piston does not actually strike ram. Air cushion between ram and piston is medium through which energy is transferred.

5

5 VIBRATION OF WOOD FORMS after pouring of concrete is done with portable electric hammer (Black & Decker).

6

6 FOR OPERATING THIS HAMMER (Wodack) power is furnished by portable 650-watt generator (Homelite) driven by gasoline engine.

7

7 FOR CALKING JOINTS in large cast-iron pipe line chipping hammers (Ingersoll-Rand) operated by compressed air are effective.

8

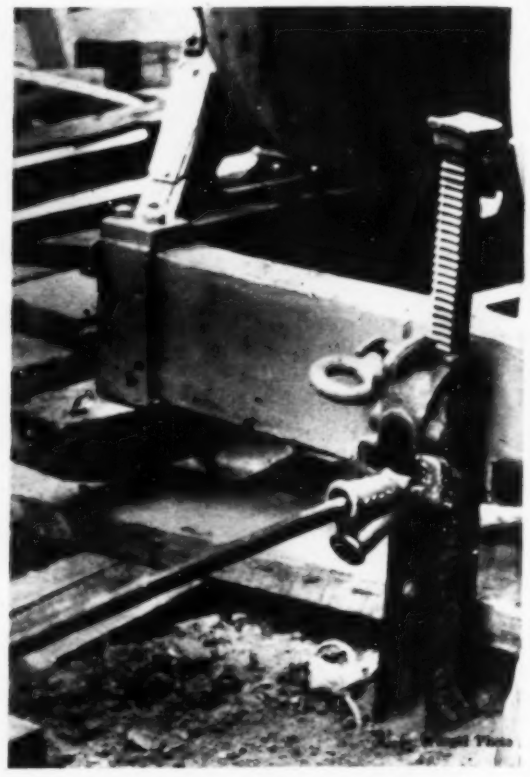
8 PORTABLE POWER PLANT operates several railway tie tampers (Jackson) for track maintenance work.

SMALL TOOLS ON JACKS CONSTRUCTION

1 **SERVICE PIPE RENEWAL,** without digging or trenching, is simplified by use of pulling jack (Simplex). By means of 2⅞-in. screw and ratchet, break-away power of 20 tons is applied to loosen pipe in any soil. Lever action with pawl and rack provides quick backing out of pipe after break-away.

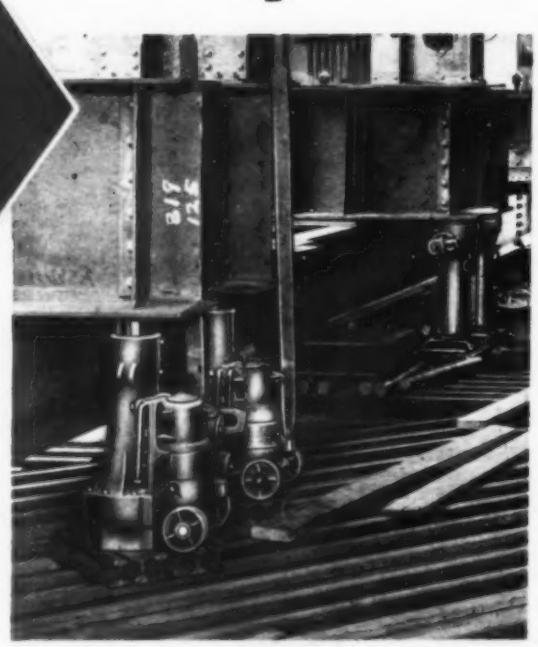
1

2 **FOR SETTING HEAVY EQUIPMENT** on construction job contractor employs ratchet jack (Joyce-Cridland) of 10 tons capacity.



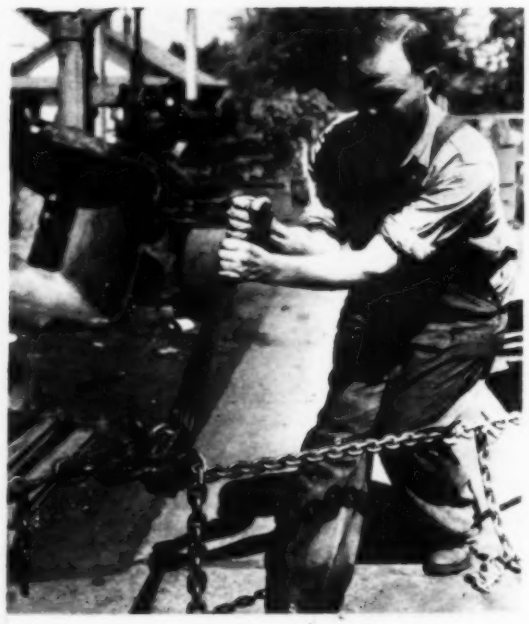
2

3 **FOR HEAVY LIFTING,** preparatory to moving of telephone company to new site, battery of heavy-duty jacks (Duff-Norton) ranging in capacity from 50 to 100 tons were used under ends of steel girders supporting weight of structure.



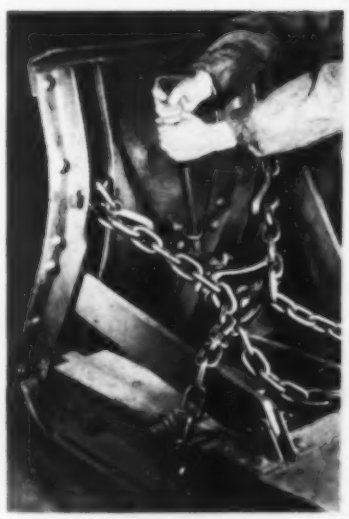
3

4 **FOR LIFTING OR PULLING** in any direction from any position this tool (LifTug) employs power of lever transmitted directly to chain. Lever, chain and sprocket move through respective arcs of travel without friction upon each other. Two pawls function directly on chain, catching each link in lifting or lowering load. Pawls lock on chain under load stress and cannot be released until lever tension is applied.



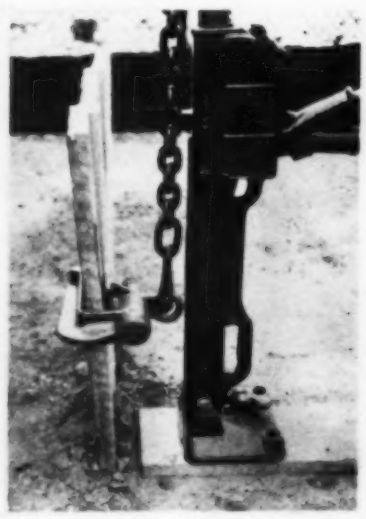
4

5 **TOOL OF MANY USES** pushes, pulls, bends, spreads, clamps, lifts or lowers like ordinary jack. In case illustrated herewith bent bulldozer blade is being straightened with Util-a-Tool (Templeton-Kenly). Lifting capacity is 17½ tons.



5

6 **SHEETPILE PULLER** consists of clamp with eye in which hook from chain on ratchet jack (Duff-Norton) operates. Handles piling up to 2½ in. thick. As jack exerts pull, clamp bites in and out comes piling.

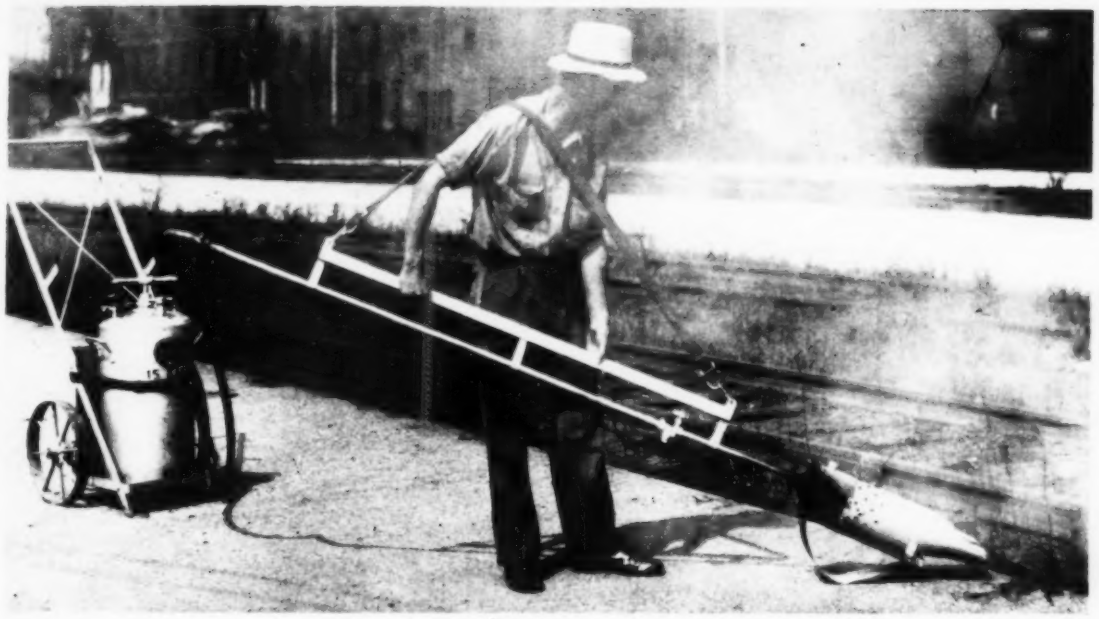


6

7 **TRACK JACK** for railway maintenance work is hydraulically operated unit (Buda) with full lift of 6¼ in. Top of toe lift for raising rails or ties is 2 in. above bottom of jack. Weighs 20½ lb. and has 20-in. lever. Plunger has grooves on top for lining rails laterally.

7

SMALL TOOLS ON GENERAL CONSTRUCTION



1

1 BURNING OF WEEDS along railway and highway rights of way is facilitated by this hand tool (Littleford) which not only destroys weed but also kills seeds, thus reducing next season's crop. It is fed with fuel by any torch-type burner.

2

2 GROUT GUN is hand-operated unit (Clark) which fills with cement holes left in concrete walls by tierods. Gun has 2-in.-diameter barrel 1 ft. long and grouts holes up to 1¾ in. Weight is 2 lb. Several types of rubber nozzle attachments are available for grouting, pointing and calking.

3

3 CUTTING BLOWPIPE is oxyacetylene unit (Linde) equipped with rivet-cutting nozzle for fast demolition work without damage to structural members.

4

4 TOOL BOX is trailer type all-steel unit (Littleford) with 25 compartments, adjustable in size, for orderly and safe storage of hand tools. Made in 6- and 8-ft. lengths. Cover has tamper-proof lock. Side shelves are provided for work bench on the job.

5

5 DERRICK GUY ROPES are made fast with Crosby clips installed by rigger with aid of open-end wrench.

6

6 IDENTIFYING MARKINGS are readily written on metal surfaces of hand tools by electric etcher (Ideal Commutator Dresser). Used on cable from transformer like ordinary lead pencil. Prominence of marking is governed by speed at which point travels over surface of metal.

7

7 TENSION INDICATOR shows stress in wire rope cables under load. Standard model (Martin-Decker) has capacity of 15,000 lb. on cables from ¼ to ¾ in. Weighs 11½ lb. Indicator may be attached to cable before strain is applied, during pulling or after it is loaded.

Turnpike Constructors

PUSH 161-MILE SUPERHIGHWAY FOR SUMMER OPENING

(1) FIRST PAVING CONTRACT on turnpike approaches completion under direction of (left to right) J. A. GAYNOR, resident engineer, C. O. ALBRIGHT, superintendent, and PAUL WALKER, of Walker Bros., contractors, Chambersburg, Pa. Frank C. Walker is other member of contracting firm.

(2) ONLY WAGON CAMP on turnpike provides living quarters for construction force of FRANK MASHUDA, Milwaukee, Wis., building 4.1 mi. of grade, drainage and structures for $580,000.

(3) TUNNEL MEN flank ROGER B. STONE, construction engineer, Pennsylvania Turnpike. At left stands W. C. KLINE, tunnel construction engineer for seven bores through ridges of Appalachian range; at right, E. R. DINKLE, resident engineer, Laurel Hill tunnel. **(4) DUNNING CREEK BRIDGE** and several miles of grading at Bedford are being completed by M. Bennett & Sons, Indiana, Pa., under active supervision of two members of firm: E. J. FINN (left) and EDWARD B. BENNETT. **(5) ROCK EXCAVATION** on heavy grading section of Empire Construction Co., Baltimore, Md., moves fast under watchful eyes of (left to right) D. P. LINGAFELT, resident engineer, T. FULP, general foreman, and E. D. PLUMMER, superintendent.

(6) BUILDING STRUCTURES on several sections for general contractors, O. OLESON (left), superintendent, and JOHN F. KEELOR, contractor, Green Lane, Pa., take a look at reinforcement in skewed rigid-frame overhead crossing turnpike at Breezewood on contract section of Empire Construction Co. **(7) JUMPING GUN** to make dirt fly at Ft. Littleton interchange, T. M. DALTON, of Dalton Bros., Paoli, Pa., moves big yardage before Turnpike Commission gives "Go" signal. **(8) ALLEGHENY TUNNEL,** entirely new bore paralleling partially excavated South Penn R.R. tunnel, in which bad rock falls had occurred, occupies attention of ROBERT M. KNOX (left), vice-president, Guthrie-Marsch-Peterson Co., contractor, Chicago, and EDWARD A. MAY, asst. res. engineer. **(9) LAUREL HILL TUNNEL** is being driven by Hunkin-Conkey Construction Co., Cleveland, under supervision of (left to right) W. M. (Bill) BENNETT, general superintendent, C. L. (Goldie) GOLDNER, walker; and FLOYD SHOFNER, vice president.

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His skill "on the throne" largely determines your profits. Give him the dragline that will give you his best. Give him a Bucyrus-Monighan and he'll "rain" with profitable dirt.
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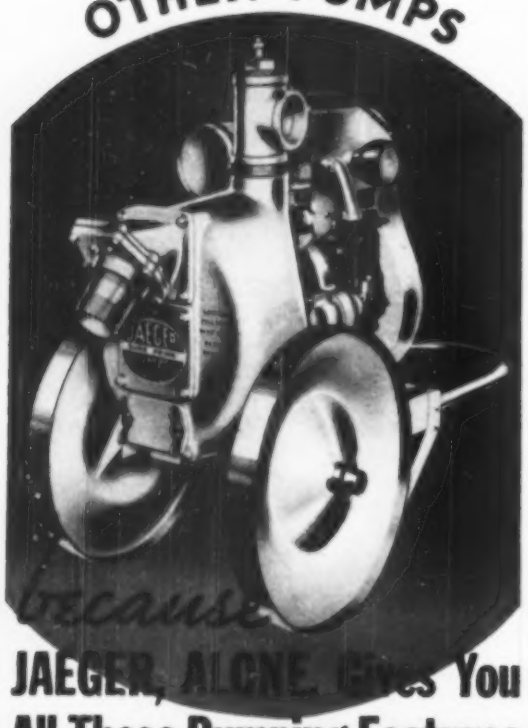
OUTSELLS OTHER PUMPS



Because

JAEGER, ALCNE, Gives You All These Pumping Features

JAEGER "PRIMING JET" — Up to 5 times faster priming and re-priming — often means difference between profit and loss on job. No adjustments — no need to "gun" engine.

POSITIVE RECIRCULATION CUT-OFF — It's controlled by flow, not pressure.

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ACCESSIBLE SEAL — always outlasts the impeller.

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Only $85 f.o.b. Factory—3000 Gallon Bantam Weighs But 52 Lbs.

DEPENDABLE, LONG LIFE CONSTRUCTION — means thousands of EXTRA hours of service.

EVERY PUMP INDIVIDUALLY TESTED for capacity and pressure before it leaves our factory.

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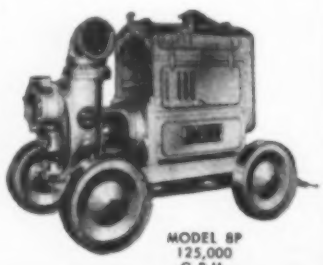

MODEL 8P 125,000 G.P.H.

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CONSTRUCTION EQUIPMENT NEWS

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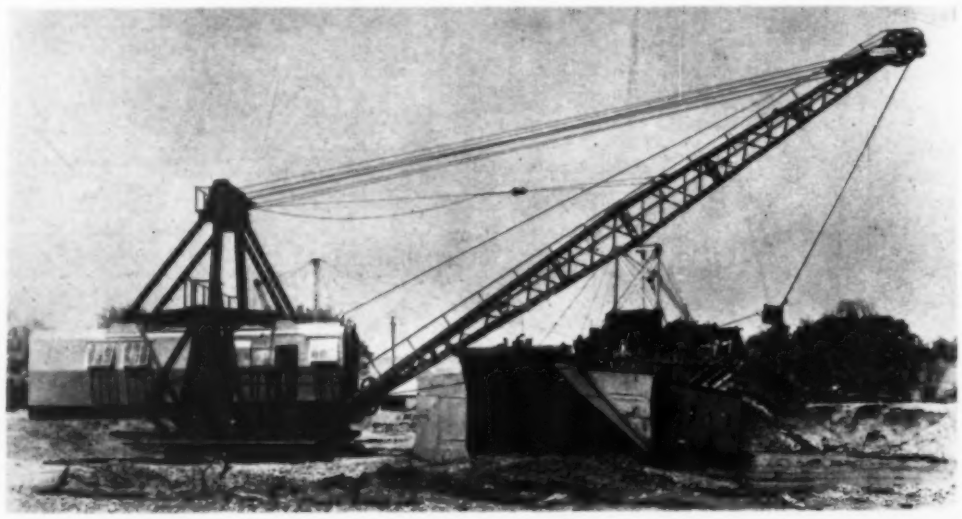
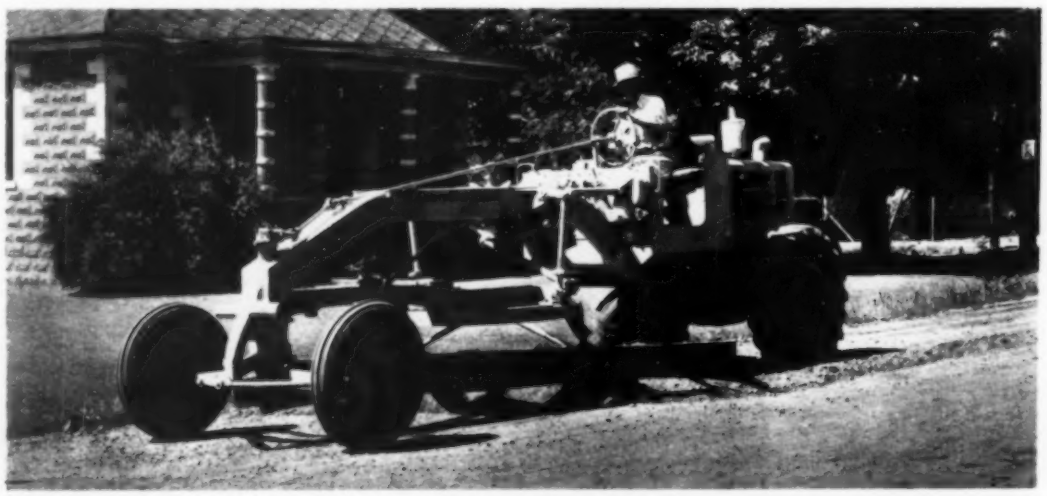
Review of Construction Machinery and Materials for NOVEMBER, 1939



WALKING DRAGLINE, of particular value in certain operations where soft ground is encountered and where low bearing pressure and extreme mobility are desirable, is shown in accompanying photograph equipped with 5-cu.yd. bucket and 100-ft. boom at work on California placer mine. When digging, upper frame rests on large-diameter base, bearing of which is high in comparison to crawlers and results in low bearing pressure on soft and marshy ground. Special feature: At initial stage of walking step, suction of base is broken rapidly enabling it to rise quickly, thus lowering resistance against material into which base has sunk and reducing stresses on operating parts. Working movement actuated by cranks, one on each end of large diameter shaft mounted across rotating frame. Each crank connected to walking "shoe" which, at rotation of crank, makes contact with ground to support weight of machine while dragline moves forward. Cycle is repeated, cranks raising walking shoes, moving them forward followed by machine. Makers claim unit has: (1) Adequate strength to meet digging conditions; (2) fast drag and hoist-line speeds; (3) rapid acceleration and high rotating speeds, assuring high output, low maintenance and maximum profit. Available in bucket sizes from 3 to 12 cu.yd. with booms from 80 to 200 ft. long. Either electric or diesel power.—**Marion Steam Shovel Co., Marion, Ohio.**

* * *

ALL-PURPOSE MOTOR GRADER, 32 hp., weighing approximately 10,500 lb. and available either with diesel or gasoline engine, is recommended for operations carried on by cities, townships special road districts, counties and other political subdivisions. Overall width of 6 ft. 8 in. and 10-ft. blade make it especially suitable for use on narrow roads where traffic would find it difficult to pass wider machine. Blade positions possible with larger machine also are obtainable with this narrow model so that ditches may be cut, banks sloped, roads widened and regraded, pitted surfaces on gravel roads scarified and reshaped, road surfaces maintained and light oil mat mixed and spread. Full-revolving blade permits machine to work in reverse, useful feature on short jobs or where turning is difficult or impossible. Single drive model equipped with 12.75 x 20-in. tires. — **Caterpillar Tractor Co., Peoria, Ill.**



DON'T LET SHEAVES *SHIMMY* IF YOU WANT ROPE SAFETY!

YES, THOSE seemingly unimportant wire rope sheaves of yours—sheaves that perhaps are hidden away, out of sight—have a lot to do with the safety of your wire rope and the life you get from it!

For example, do your sheaves "shimmy"? If so, remember that's the signal for sheave misalignment—the result of abnormal bearing wear due to improper lubrication. And excessive rope wear follows.

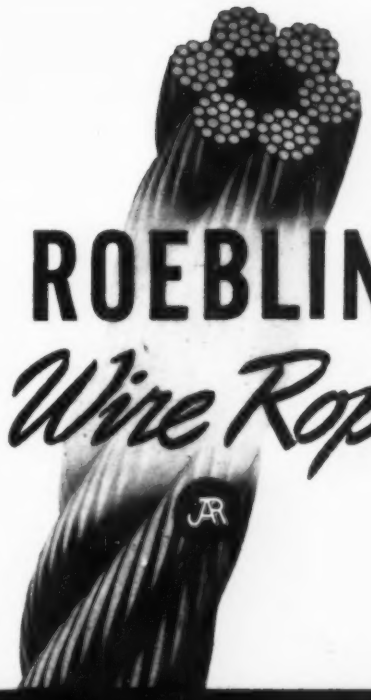
Then, too, when rope sheaves are neglected there are other dangers. Bearings may "freeze" because of improper lubrication or become jammed—and this means that flat spots will be worn in the sheaves by the rope.

Or your sheave grooves may not run true—causing rope wobble. Or the sheaves may be too small or too soft. At any rate, all of these things accelerate rope wear—reduce rope safety.

Periodical inspection and proper maintenance of wire rope sheaves pays big in wire rope service and safety! For full information regarding proper sheave maintenance practice, to meet your own individual requirements, consult the nearest Roebling Office.

This advertisement is published in the interest of all wire rope users, to help them obtain greater safety, service and efficiency from their wire rope.

JOHN A. ROEBLING'S SONS COMPANY
Trentop, N. J. *Branches in Principal Cities*



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The ⅜ yard Hi-Power is a bucket the truck crane man swears by — for speed, digging power and yardage. Let us quote you prices on any size from ⅜ yard up.

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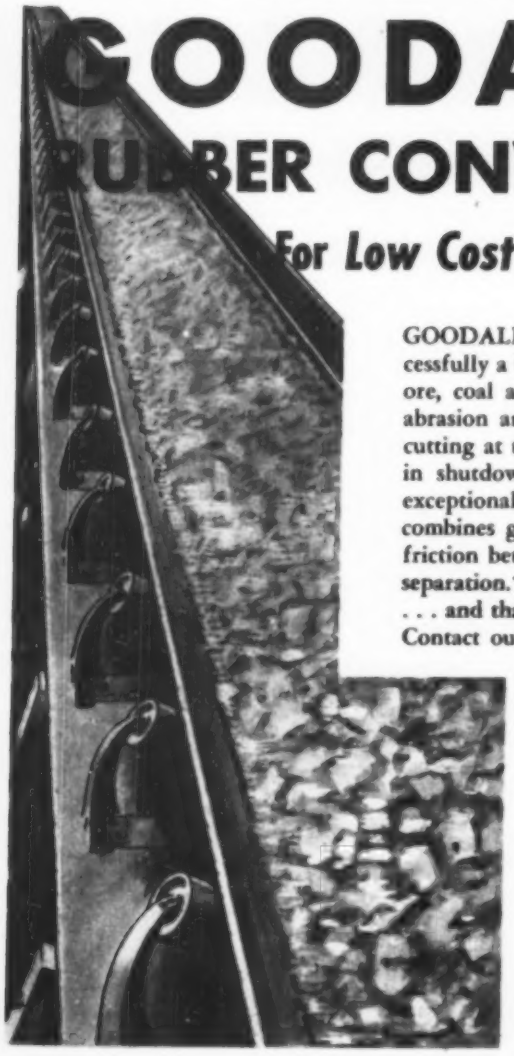
For Low Cost Handling of Abrasive Materials



GOODALL "SSS" CONVEYOR BELTING proves how successfully a belt *can* be made to resist the destructive action of rock, ore, coal and other abrasive materials. Built to withstand severe abrasion and frictional wear on the haul, as well as impact and cutting at the loading point, "SSS" will show a marked reduction in shutdowns for repairs and replacements. The cover stock is exceptionally strong and tough. The specially woven duck body combines great longitudinal strength with proper flexibility. The friction between body and cover eliminates any possibility of ply separation. From start to finish, "SSS" is *all* GOODALL quality . . . and that means *full value!* Let us quote on your requirements. Contact our nearest branch.

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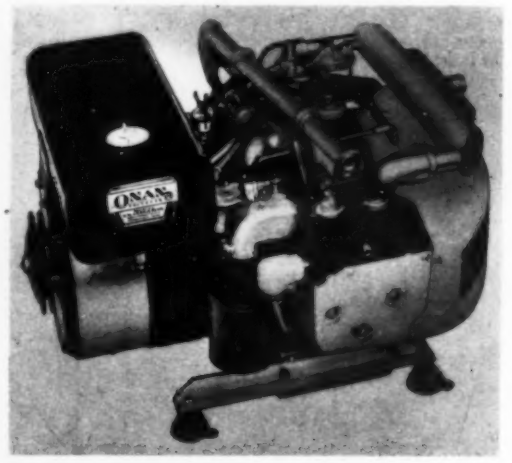
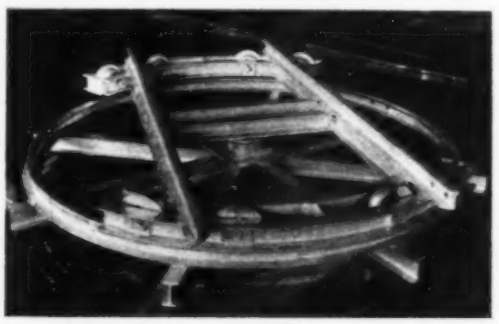
LIGHTWEIGHT, AIRCRAFT-TYPE ELECTRIC GENERATING PLANTS have output range from 1,000 to 7,500 watts and various voltages, 50 to 800 cycle a.c. or d.c. Powered by heavy-duty 2-cylinder, op-



posed, 4-cycle, air-cooled, gasoline engines equipped with high tension magnetos, fuel pumps and automatic chokes. Ignition systems completely radio shielded. May be equipped with handles or pneumatic dollies for easy portability. Substantial construction said to make them of particular value to contractors in need of portable unit for operation of electrical devices. — **D. W. Onan & Sons, Minneapolis, Minn.**

★ ★ ★

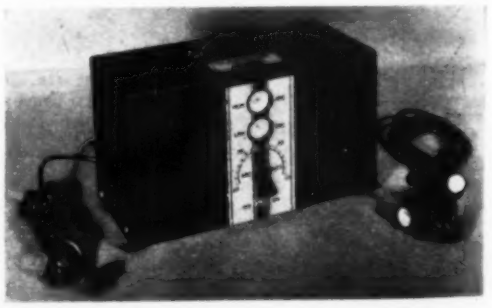
MUCKING MACHINE TURNTABLE capable of turning 32,000-lb. Conway tunnel mucker is useful on tunnel jobs where mucking crews alternate between two headings, as mucking machine can be turned on table to serve either heading. Some jobs keep



turntable at foot of shaft to permit mucking machine from one heading to be brought over to other heading in case of any trouble with second mucker. When mucking machine is properly spotted on turntable, all weight is carried by ball-thrust-bearing at center. Two men then are said to be able to turn 16-ton mucker.—**Robert S. Mayo, Tunnel Equipment, Lancaster, Pa.**

★ ★ ★

EFFICIENT WELD VOLTAGE CONTROL made possible by Arc-Length Monitor which removes one of main variables in welding technique, thus promoting higher quality welds. Two tiny bulbs mounted inside welder's helmet, one on each side of window, apprise him of length of his arc. Both bulbs are dark



at selected voltage. One at right glows faintly and with increasing intensity as voltage increases; one at left responds similarly as voltage decreases. Maximum brilliance kept well below point of injuring operator's eyes or damaging his work. Instrument itself which contains signal lights similar to those in operator's helmet, is placed where it can be ob-

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If you want to get your products specified for the urgent construction now under way come to *construction headquarters* and get started right with your advertising. This construction surge springs from two forces, (1) general business recovery and (2) the European situation which is producing new demands for U. S. products from both continents.

The European situation particularly is imposing emergency problems on architects, consulting engineers, constructors, contractors, federal engineers and civil engineers with manufacturing plants and utilities to expand and modernize plant, utility and transportation facilities. The call is out for skilled engineers and designers; new and increased advertising schedules for 1940 are coming in at *construction headquarters;* the demand for reprints of the index to building articles published the first six months of 1939 has exhausted the supply — evidence that activity is real in this industry that feels the initial spurt of war preparedness and any increase in general business activity.

With all kinds of construction projects piling high on drafting boards, *now* is the time to use the fastest, most economical force in selling. That force is *advertising — publication advertising — advertising in Engineering News-Record and Construction Methods* which provide the most complete coverage (52,000 paid circulation with over 208,000 readers) with fast frequency and at a lower cost than any other two publications in this world's busiest industry.

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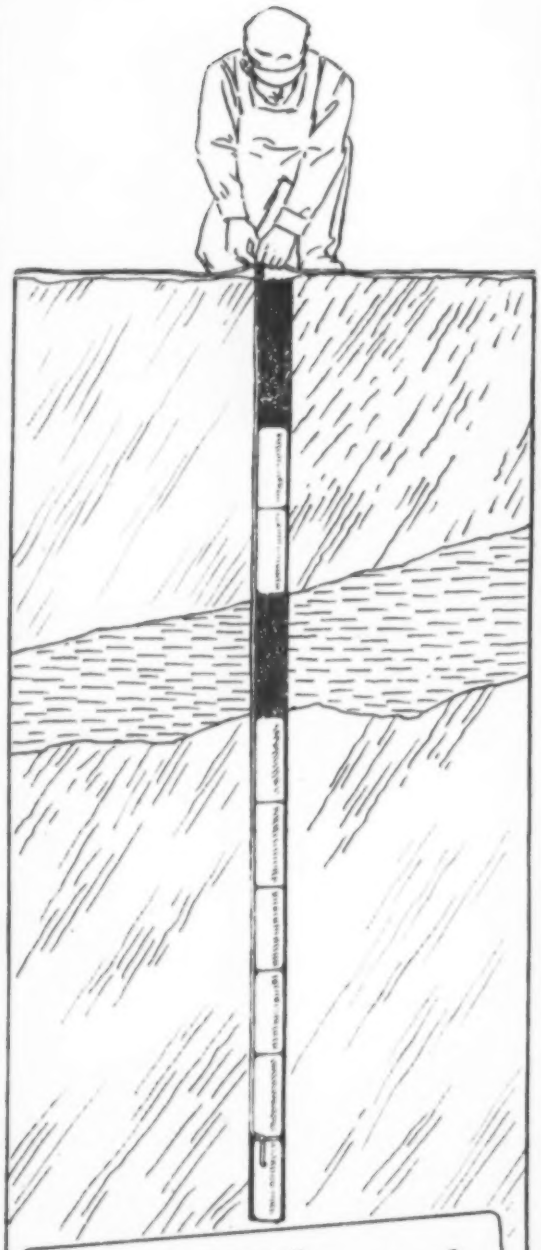

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Detonating the separate charges in a deckload is greatly simplified when Primacord-Bickford Detonating Fuse is used as the detonating agent. The Primacord is fastened to the first cartridge and lowered to the bottom of the hole. Since it will be in contact with *all* cartridges in the hole, whether these are separated from the main charge or not, you are assured that each and every cartridge will "go." And each, being detonated directly by the Primacord, will have the added force of a primer cartridge.

This insensitive detonating fuse consists of a core of PETN contained in a waterproof, flexible textile cover. It is light, strong, easy to use. Write for the Primacord booklet.

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SIMSBURY, CONNECTICUT, U. S. A.
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PB 14 *Detonating Fuse*

served by welding superior. Monitor said to be particularly effective for use on light metals such as stainless steel, where close control of arc is necessary. It also is valuable for checking ability of experienced welders and for training new operators.—**A. O. Smith Corp., Milwaukee, Wis.**

★ ★ ★

MALLEABLE BASE SCREW JACKS are claimed by their makers to be tougher and less subject to breakage due to dropping or rough handling. Also

it is said that friction is reduced 88 per cent because of floating cap with a 9-deg. float that rests on chrome-molybdenum steel ball and completely centers load.—**Templeton, Kenly & Co., 1020 S. Central Ave., Chicago, Ill.**

★ ★ ★

AIR-COOLED ENGINE which features rugged design and interchangeability of parts is single-cylinder model with 2¾- and 3¼-in. bores and 4-in. stroke, depending on models which rate 2½ to 4 and 4 to 5 hp. Equipped with large roller and ball

bearings. Other features: Removable cylinder block, large oil and gasoline capacity, speed control and S.A.E. standard mountings for all accessories. Extra heavy flywheel said to give low speed lugging ability and exceptional smoothness at all speeds. Special gear oilers claimed to feed in all weathers at first turn of crankshaft.—**Novo Engine Co., Lansing, Mich.**

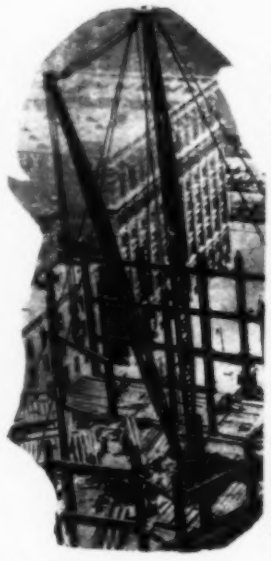
★ ★ ★

GASOLINE POWER UNIT, said to supply economical power to gravel machines and screening plants, asphalt plants, portable concrete mixers, pumps and other industrial equipment requiring 15 to 18 continuous horsepower. Consists of 4-cycle, 4-cylinder gasoline engine with 3¼x3½-in. bore and stroke and displacement of 116 cu.in., mounted on welded angle iron base and complete with radiator, hood, removable louvered side plates, fuel tank, clutch, clutch housing and pulley shaft. Has removable cylinder liners, high tension magneto ignition,

TRADE MARK DOBBIE ESTABLISHED 1867

All Steel DERRICKS

Guarantee Safety



Steel Erectors Guy Derrick, with Ball Bearing Footblock.

When you guarantee safety, you economize—for safety means uninterrupted operation and lowest possible maintenance costs.

And DOBBIE All-Steel Derricks have been designed for safety and consequent economy. They have a safe load capacity of almost twice their rating. You need this assurance of dependable safety and continuous performance.

SAVE POWER BY USING BALL OR ROLLER BEARING FOOTBLOCKS AND SHEAVES. Built in both Guy and Stiff-leg types. Write for information and prices.

Dobbie Foundry & Machine Co.
Niagara Falls, N. Y.

Other Dobbie Products—Steel Derricks, Timber Derrick Fittings, Hand Winches, Motor Driven Winches, Blocks, Sheaves, etc.

CMC 2 Wheel End Discharge Trailer
CMC 4 Wheel End Discharge Trailer
CMC Dual Prime Pump
CMC Pneumatic Tired Material Cart

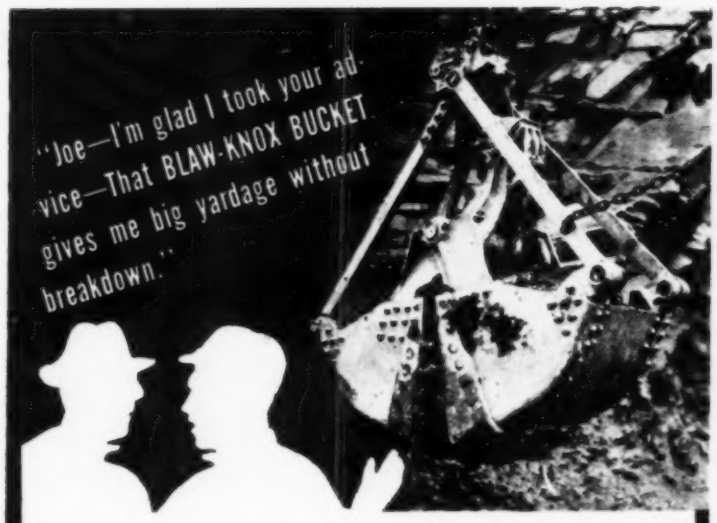
THE MOST FOR YOUR MONEY IN EQUIPMENT!

You're RIGHT when you pick CMC. You get the latest in Mixers all sizes—engineered for highest daily output. They mix faster—move faster and are built to "take it".

SEE CMC—THEN DECIDE!

Write for catalog showing newest models of Mixers, Plaster and Mortar Mixers, Dual Prime Pumps, Hoists, Saw Rigs, Pneumatic Tired Carts and Barrows. Write today!

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

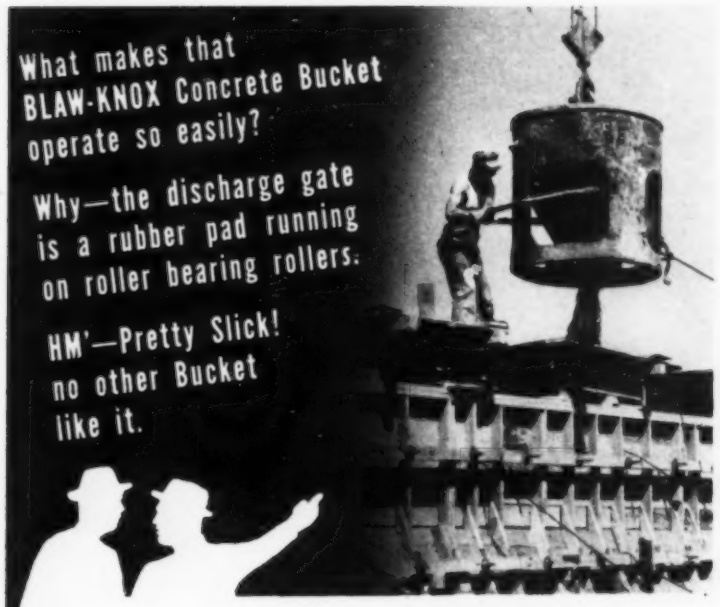


● Contractors know that the proper use of modern steels and alloys at critical points is their assurance of long uninterrupted service when they buy a Blaw-Knox Bucket.

If you aim to increase yardage and efficiency, to reduce maintenance costs and prolong the life of your buckets—investigate Blaw-Knox Buckets for all kinds of digging and rehandling Send for Blaw-Knox Bulletin No. 1561.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.
Offices and Representatives in Principal Cities

BLAW-KNOX
Clamshell BUCKETS


What makes that BLAW-KNOX Concrete Bucket operate so easily?
Why—the discharge gate is a rubber pad running on roller bearing rollers.
HM'—Pretty Slick! no other Bucket like it.

• Controllable discharge, Blaw-Knox CONCRETE BUCKETS are a popular concrete placing unit. Used by contractors everywhere.

Send for a copy of the catalog on Blaw-Knox Concrete Buckets, No. 1586.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMERS BANK BUILDING · PITTSBURGH, PA.

BLAW-KNOX *Roller Gate*
CONCRETE BUCKETS

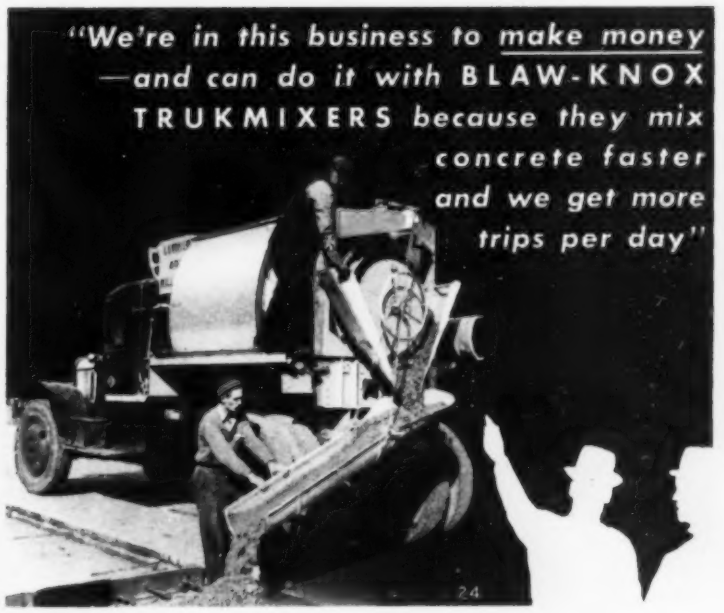
For compacting earth fills—the practical design of Blaw-Knox Sheepsfoot TAMPING ROLLERS appeals to contractors because they give uninterrupted service and meet all modern specification requirements.

The roller units are full floating, on husky frames—built for long hard use.

Send for complete details and prices.

BLAW-KNOX DIVISION of Blaw-Knox Co.
FARMERS BANK BLDG. PITTSBURGH, PA. 19

BLAW-KNOX
TAMPING ROLLERS


"We're in this business to make money —and can do it with BLAW-KNOX TRUKMIXERS because they mix concrete faster and we get more trips per day"
24

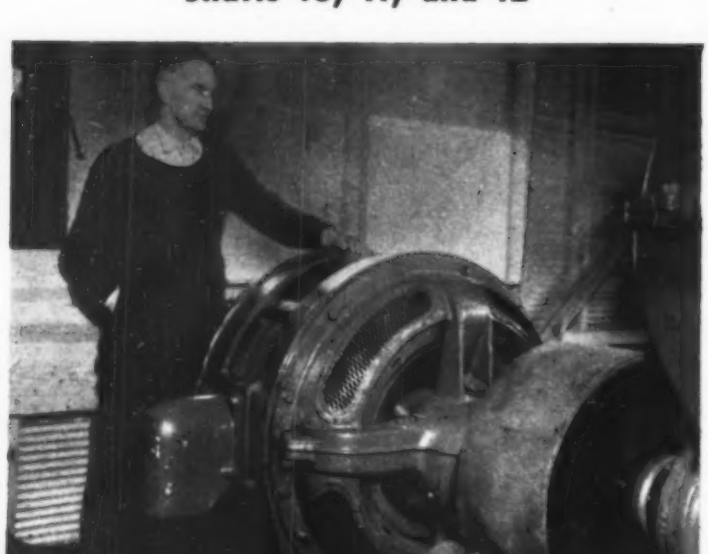
It's a comfortable feeling to have truck mixers working for you that perform 100% under all conditions. No breakdowns—no worries.

You make a *profitable investment* when you buy Blaw-Knox Trukmixers and agitators. Write for Catalog No. 1582.

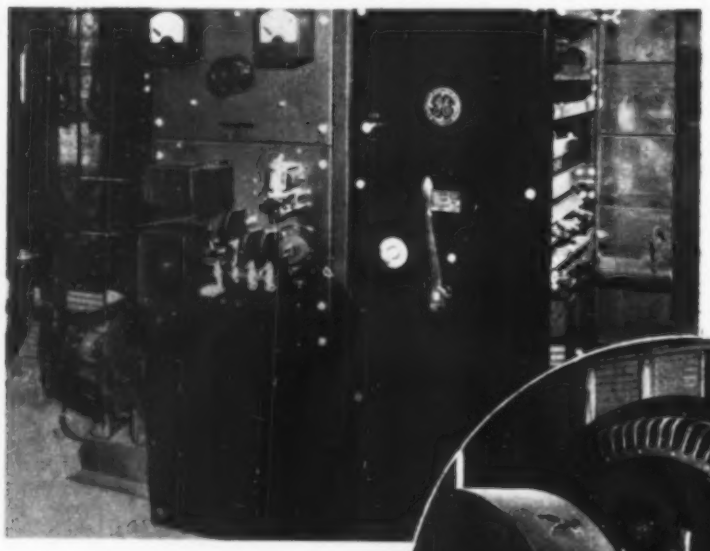
BLAW-KNOX BLAW-KNOX DIVISION
Agitators and **TRUKMIXERS**

How G-E Equipment Helps

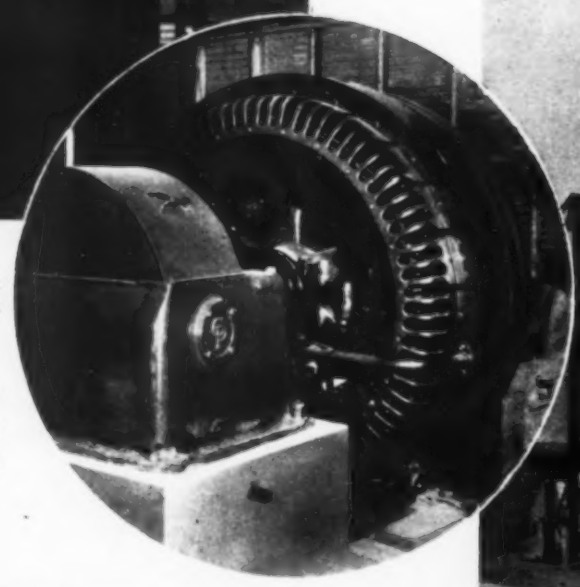
Some Close-ups of Electric Equipment at Shafts 16, 11, and 12



George Crooks, electrical engineer for the S. A. Healy Co., looking over one of the two G-E two-speed hoist motors installed in the house at the top of the headframe for Shaft 16



G-E control and motor-generator set for the synchronous motor shown at the right

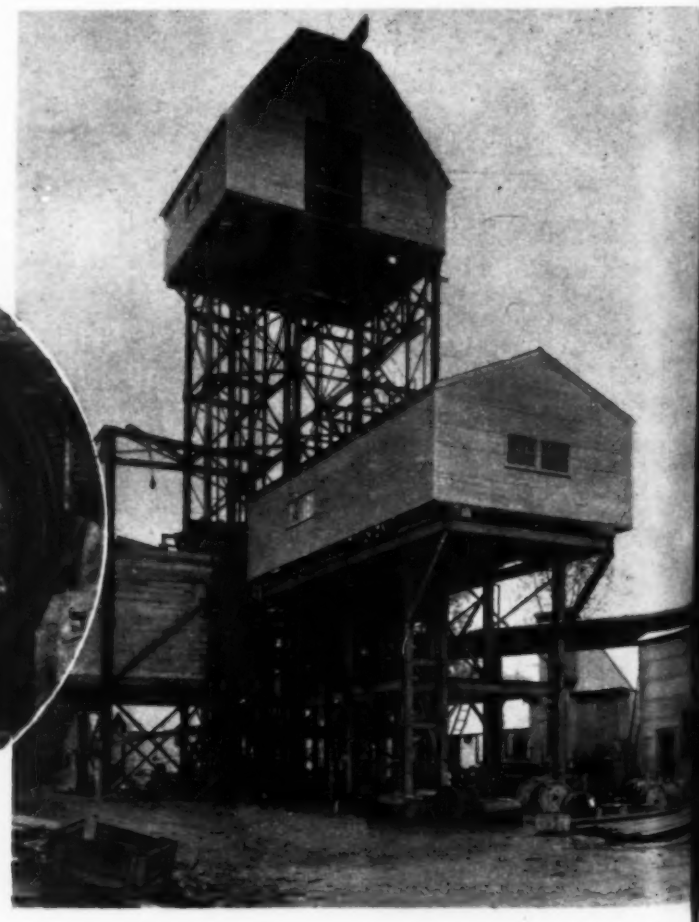


One of two G-E 300-hp synchronous motors driving air compressors. Synchronous motors help keep down power costs by improving power factor

THE pictures on these two pages show typical G-E equipment being used by two contractors—the Utah Construction Co. and the S. A. Healy Co.—in their work on the Delaware Aqueduct.

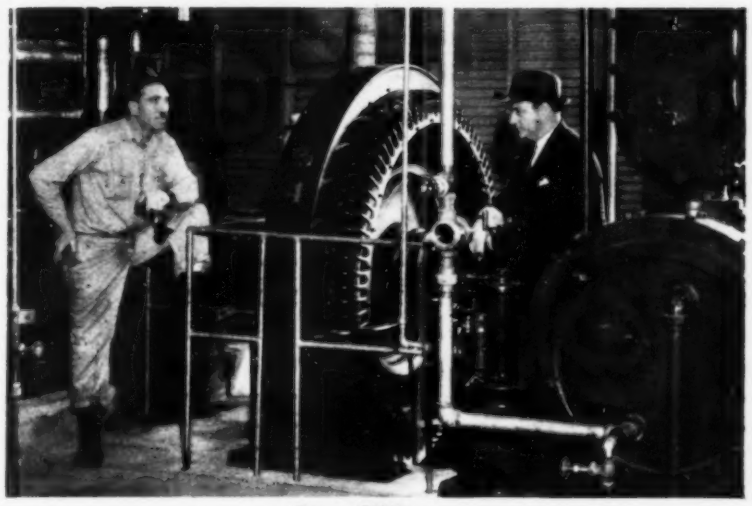
The aqueduct is an 85-mile tunnel bored far underground through solid rock to bring a plentiful supply of water to New York City. Thirty shafts, from 310 to 1,550 feet deep, have been sunk to the tunnel level. Contractors are now tunneling in both directions from these shafts.

When you're planning a job, check your electrical requirements with the nearest G-E office. If you haven't its address, write to General Electric, Schenectady, N. Y. Perhaps a discussion of your electrical problems with a G-E engineer will show you how greater use of electricity can increase the speed and safety of your operations—help you clear a bigger net.



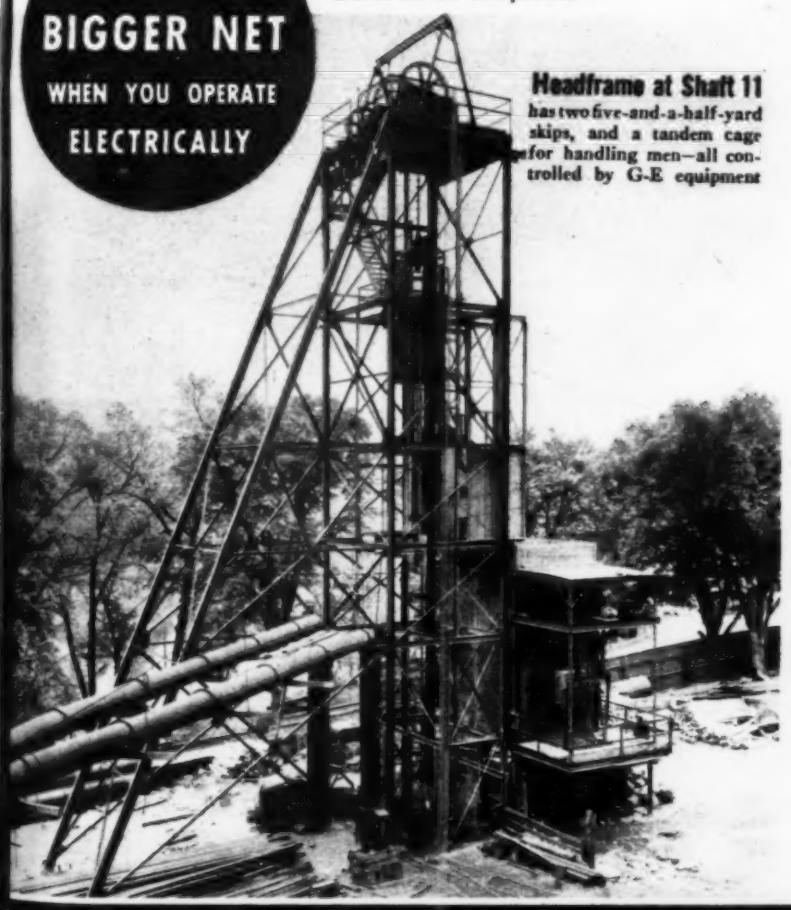
Headframe at Shaft 16 during the final stages of its construction. The photos on this page are of G-E equipment installed by the S. A. Healy Co. at this shaft

Build *Delaware Aqueduct*



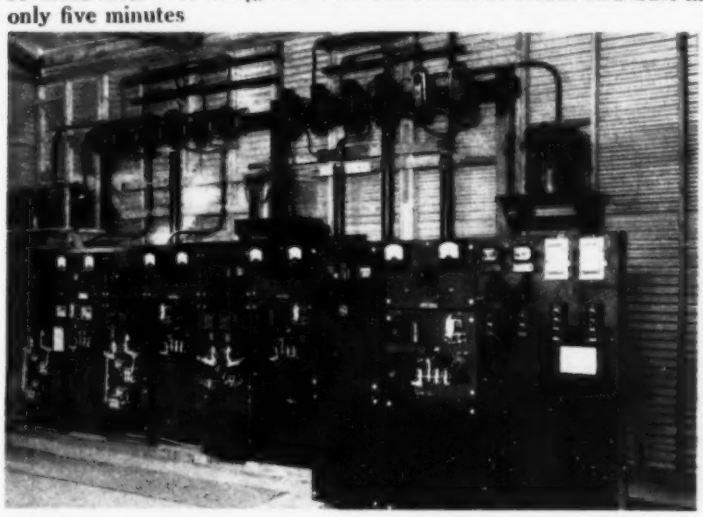
Tom O'Mara, electrical engineer for the Utah Construction Co., Inc., tells a G-E sales engineer, Bill Woods: "No trouble of any description with all the G-E equipment on this job." The 500-hp G-E motor shown drives an air compressor

YOU CLEAR A **BIGGER NET** WHEN YOU OPERATE ELECTRICALLY

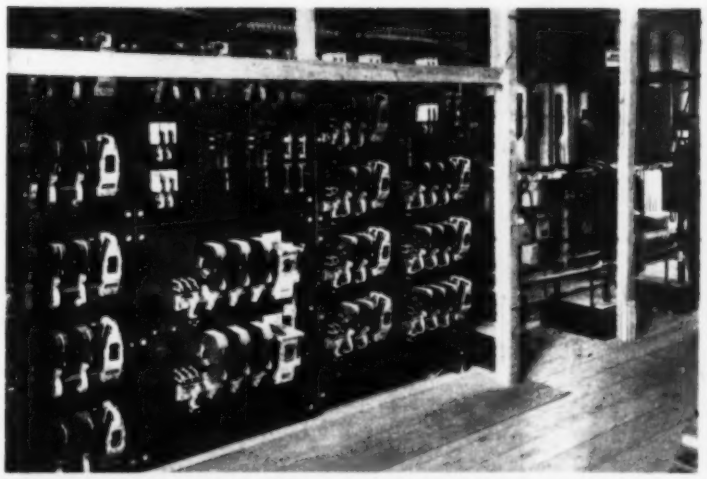


Headframe at Shaft 11 has two five-and-a-half-yard skips, and a tandem cage for handling men—all controlled by G-E equipment

Two G-E reversing synchronous motors, one of 125 hp and one of 150 hp, drive the 12,000-cfm blowers at Shaft 11. The blowers, reversed after shot firing, can clear the tunnel of smoke and dust in only five minutes



G-E fully automatic control board for the two G-E blower motors and the two G-E compressor motors at Shaft 11



"We can get any speed we want with G-E hoist control," says Tom O'Mara. The control shown here is at Shaft 12, another Utah Construction Co. job

GENERAL ELECTRIC

Note the absence of sheeting.

Another Dry One!

Each year more contractors depend upon the MORETRENCH WELLPOINT SYSTEM to give them dry results at a fixed cost on their wet jobs.

Are you wasting time and money on experiments?

MORETRENCH CORPORATION

Sales and Rental Office: 90 West Street, New York

Plant: Rockaway, New Jersey — Warehouse: Joliet, Illinois

INCREASE YOUR DRAGLINE YARDAGE PUT A PAGE BUCKET ON THE JOB!

Among dragline users Page Automatic buckets have a reputation of increasing yardage 15% to 30% over that obtained with other type buckets of equal size and weight.

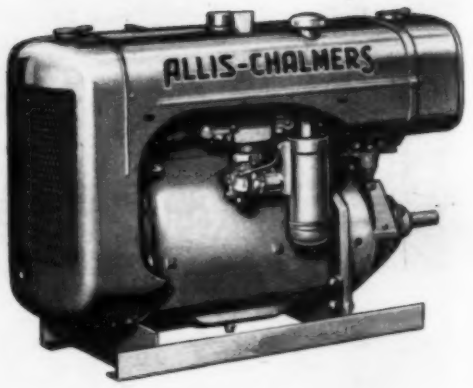
The reason,—the patented rounded front design which forces Page buckets to use all of their weight most effectively for digging,—dig at any depth.

Get the most out of your dragline,—increase yardage and profit. Put a Page Automatic on the job! See your equipment dealer or write for additional information.

***Dig with a* PAGE AUTOMATIC!**

PAGE ENGINEERING COMPANY

CLEARING POST OFFICE — CHICAGO, ILLNOIS



heavy-duty oil bath air cleaner and oil and fuel filters. Develops maximum of 19 brake horsepower at normal governed speed of 1,400 r.p.m.; 22 brake horsepower maximum at 1,800 r.p.m. Maximum torque is 74 lb./ft. developed at 1,100 r.p.m. Height, 31 1/16 in.; width, 17⅝ in.; length, including starting crank, 52¾ in. — **Allis-Chalmers Mfg. Co., Milwaukee, Wis.**

★ ★ ★

PORTABLE ELECTRIC SANDER, said to be easy to handle, to be able to operate in difficult corners and to work on either flat or curved surfaces, sands, polishes and rubs with motion similar to that of man polishing by hand. Rubs back and forth with even pressure. Operates from light socket (a.c. or d.c.). Sandpaper or polishing cloth is attached to this

flexible base by simple device. Machine may be used for feather edging around repaired automobile body or fender spots and for sanding, rubbing and polishing furniture, marble, display fixtures, canvas, leather, interior finish and similar jobs. Feature is Du Pont neophrene (chloroprene rubber) cover for shaft actuating flexible plate which prevents lubricant from getting on work and at same time does not hamper complete flexibility of machine and is not deteriorated by contact with lubricant used.— **Chicago Tool & Kit Mfg. Co., 116 E. 33rd St., Chicago.**

★ ★ ★

LUMINAIRE FOR HIGHWAY LIGHTING (left) has (1) die-cast aluminum hood said to be lighter and stronger and to present better appearance than sand-cast hoods; (2) fluted reflector which, in addition to improving efficiency and light control, is said to result in better lamp performance through lower temperatures inside lamp; (3) new refractor for better light distribution and utilization. Spun-on globe claimed to set record for low breakage rate.— **General Electric Co., Schenectady, N. Y.**

PURPLE-STRAND *FORM-SET* ROTARY LINE

BETHLEHEM Specify FORM-SET PRE-FORMED ROPE

Made of premium-price extra-tough steel

EVERY pound of steel that goes into Purple-Strand rope would command an extra price on the open market, for extra care and extra time are required in steel-making departments to produce this metal. Special furnaces, reserved for the out-of-ordinary job, are used. Special practices are observed under strictest metallurgical control in the open hearths, soaking pits and rolling mills.

The result is a superior steel, the first requirement for superior rope. This steel, drawn into wire, has more than four times the strength of structural steel. It has a toughness far exceeding any ordinary steel. Its fatigue resistance is exceptional. And above all, because of close control and a strict schedule of testing, these qualities are the same in mile after mile of wire.

Purple-Strand quality, however, does not end with the premium-price steel. Every step in the making of a Purple-Strand rotary line involves extra skill and attention. For example, design has been perfected until this line is a real precision machine. In addition to IWRC lines, a line with the Uni-Zact core is available, at no extra cost over fibre-center rope. Lubrication has been studied and special lubricants developed. Every conceivable step has been taken to make Purple-Strand Form-Set the finest rotary line money can buy.

Bethlehem wire rope is available through distributors. Write Bethlehem Steel Company, Bethlehem, Pa., for the names of wire-rope distributors in your vicinity.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

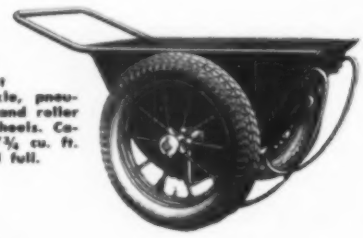
JACKSON BARROWS

Where there's a need—
there's a sturdy JACKSON

EST. 1876

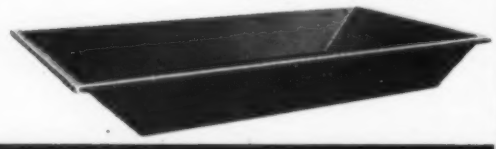
Jackson Type M-11 with pneumatic tire — the only barrow with tray having double folded corners and three thicknesses of steel at folds. Non-leakable. Available also with steel wheels.

Jackson Steel Frame quality 40 and 80 Contractors Barrows with Round Fronts. Pressed trays of heavier gauges; edges reinforced with steel rods. Pressed steel handles with wooden grips. Shape of handles lessens lift distance and wheels carry more load. Heaped capacities 4 and 4½ cu.ft.



Jackson Type 88 Concrete Cart with drop axle, pneumatic tires and roller bearing wheels. Capacity: 7¾ cu. ft. heaped full.

ALSO:
Coal, Coke, Ash, Concrete, Foundry Pig Iron, Contractors, Middy, Stone, Machine Shop, Garden Barrows; Carts, Salamanders, Lawn Rollers, Mortar Mixing Boxes and Pans.



Jackson Steel Mortar Mixing boxes — formed from single sheets—rigid, watertight. Made in three sizes from 60 to 108 inches long, 32 to 48 inches wide, 11 inches deep.

Write for the New 48-Page Complete JACKSON Catalog CM.

JACKSON MANUFACTURING CO.
HARRISBURG, PA.

- LOW FIRST COST
- EASY TO OPERATE
- PORTABLE · FOOLPROOF
- INNUMERABLE APPLICATIONS IN CONSTRUCTION WORK

Illustration shows a Model F Safety-Pull straightening piling on the New Orleans waterfront

Within the price reach of all contractors — whether the need is for one or a battery. One man and this hoist can handle numberless lifting, pulling, and routine or emergency repair jobs at a tremendous saving in time and money —truly a tool of a thousand uses. Operates in any position. Capacities from ¾ ton, which weighs 14 lbs. to 15 ton which weighs 150 lbs. Invaluable to contractors who want speed, safety, efficiency, and economy. Send for literature giving construction and application details.

COFFING HOIST CO. DANVILLE ILLINOIS

"NOW I KNOW WE OUGHTA USE A MARTIN-DECKER TENSION INDICATOR"

NOW I KNOW WE OUGHT'A USE A MARTIN-DECKER TENSION INDICATOR!

Over-loads on lines cause breakage — under-loads are inefficient. With a Martin-Decker Tension Indicator checking your lines and cables in the field, you can KNOW, *without paper calculations and without deadening*, the actual load *as it falls on the line! Just* clamp it on — no wrenches needed. It'll catch those strong steady pulls or sudden impact loads with equal efficiency, and give you information that will increase the safety and economy of your operations!

Available in Miniature, Standard and Heavy Duty Models for all lines from 3/16" to 2¼" diameter, fully adjustable for temperature changes. Write for information on the Tension Indicator and also on the Martin-Decker Measuring Line Weight Indicator!

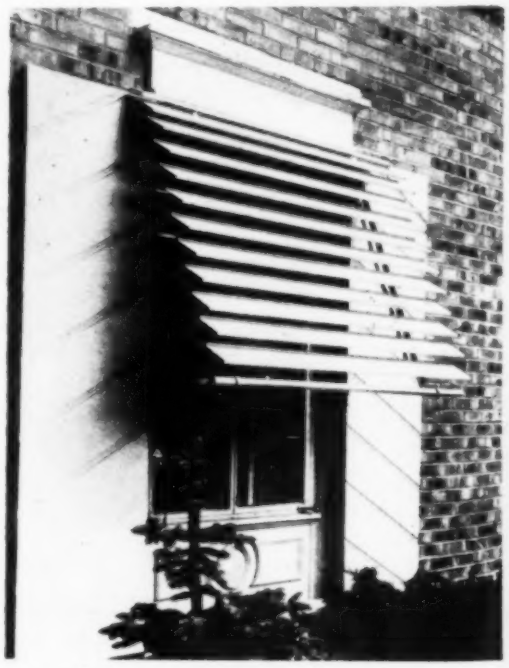
MARTIN HOME OF THE TENSION INDICATOR **DECKER CORP.**
LONG BEACH, CALIFORNIA

ELECTRIC MOISTURE DETECTOR said to provide simple, scientific method of detecting surface and sub-surface moisture. Needle electrode is pressed into material, push button is pressed and indicating needle shows whether wall or material is wet or dry, and ready for application of finish—

paint or other decoration. Special bridge circuit said to insure highest accuracy irrespective of whether battery is new or old. Needle points designed to prevent marring of surface finish. Dial may be calibrated to meet unusual conditions. Besides testing plaster walls for decoration, device is valuable for checking moisture content of molds and tracing leaks. Unit, complete in metal case, may be carried in pocket. No connection with electric circuit required as machine operates from batteries which are said to last one year. Size, 2½x3x7 in. Weight, 2 lb. — **Colloid Equipment Co., Inc., 50 Church St., New York City.**

★ ★ ★

VENETIAN-TYPE AWNING made entirely of sheet metal is said to afford year-around sun protection, full visibility, ventilation and light control. Other advantages: (1) Elimination of expense and inconvenience of installing, removing, storing, repairing and re-covering; (2) reduction of concentration of



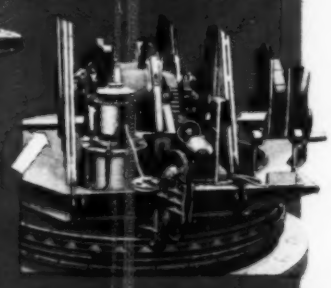
heat around window openings, thus improving ventilation and lessening cooling load on air-conditioned homes and business buildings. Shutters of new Rusco awning are made of galvanized Paintgrip sheets bonderized at steel mill by patented process enabling them to take and hold paint. All types of windows in residences, business buildings and institutions may be fitted — **The American Rolling Mill Co., Middletown, Ohio.**

MARION
WALKER FEATURES

The features described below are exclusive with the MARION WALKER

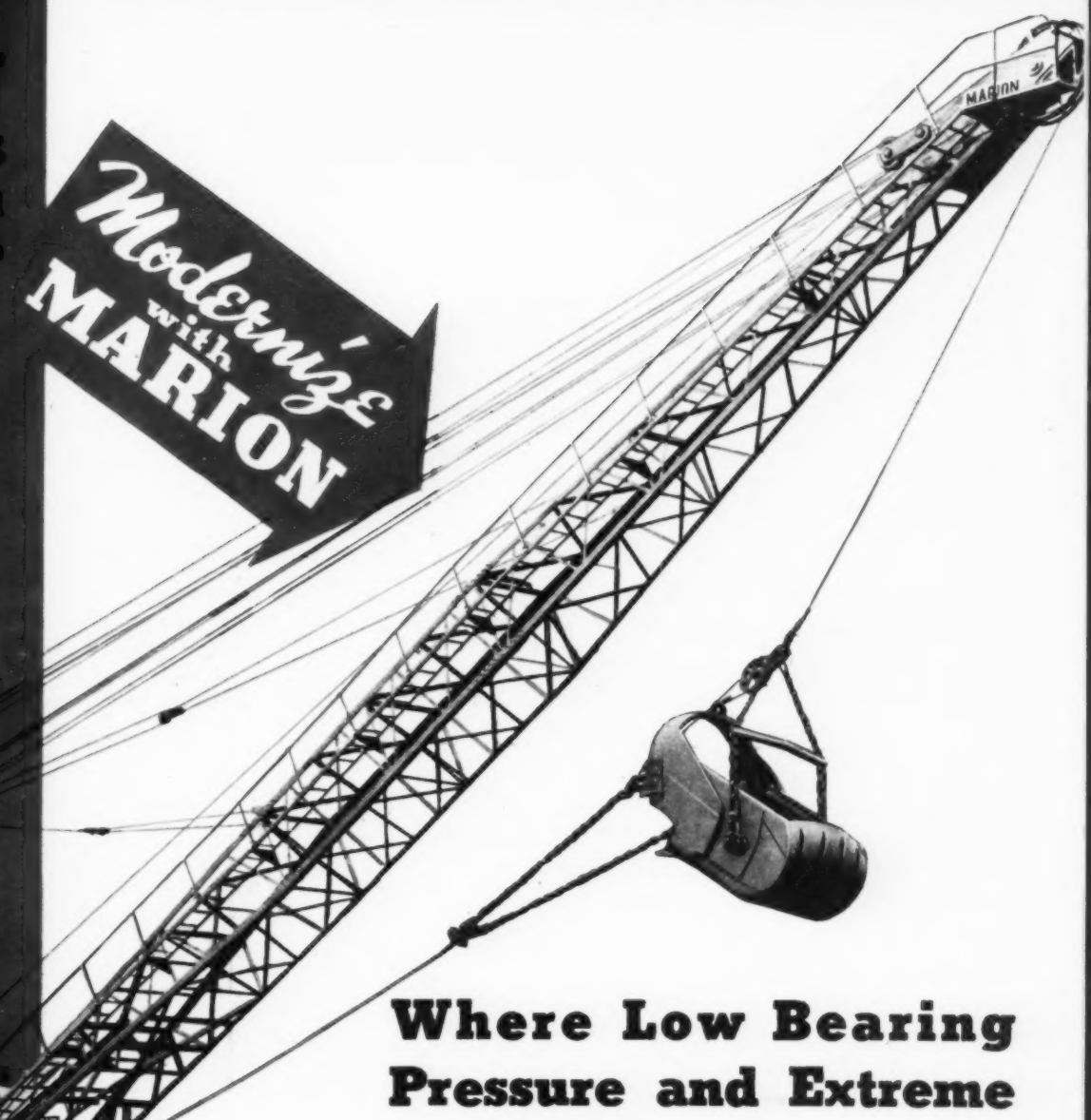
The sketch below portrays the actual step taken by the MARION WALKER. Note the forward inclination of the cross which results in hoisting motion before the step is taken.

A rear view of the MARION WALKER showing how its huge cast base is lifted off the ground for the forward step.



The largest steel, three piece propelling shoe ever cast. It rests under the rolling frame and has a crank at each end. This shaft is the basis for its simple and effective propelling.

The walking frame unit of the MARION WALKER is self-contained and is located at each side of the revolving frame. A member of a steel, walking arm and crank.



Modernize with MARION

Where Low Bearing Pressure and Extreme Mobility are Important

MARION WALKER

DRAGLINES

Through a new application of the walker principle of propelling, the MARION WALKER insures low bearing pressure – maximum mobility and uninterrupted service where ground conditions are impassable for regular excavating equipment. By rapidly breaking the ground suction at the initial stage of the step, the MARION WALKER is enabled to raise its huge base and secure ample clearance before the complete step is taken. It is for this important reason the MARION WALKER deserves your thorough investigation. Available with bucket sizes up to 12 cubic yards and boom lengths from 80 to 200 feet. . . . . .

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio, U. S. A.

IN THIS BOOK

• Here is the clipper story — every type, model and capacity. When you're concreting a stretch of highway — pouring floors on a building job — putting in a dam or a heavy foundation — you need Porter Bolt Clippers. They will save you time and money in cutting reinforcing fabric or rods — trimming off the wires after removal of forms — cutting bolts or chain — splitting nuts — cutting wire rope. One or more Porter Cutters will "earn their keep" on any contracting job. Send for this book today.

PORTER SWIVEL Cutter

The heat treating of these cutting jaws is one big reason for Porter Clipper efficiency — the reason why they cut tough steel and stand up under continuous use. The Porter Swivel Cutter with the "wrist action" bringing the cutting head to the work — around corners. Saves man power — speeds up work; proved by years of use. There is a Porter model for every requirement.

The Bolt Clipper People
EST. 50 YEARS

H. K. PORTER, INC., 22 Ashland St., Everett, Mass.

Big Profits

EVEN FOR THE LOW BIDDER

Insley Type K, ⅜ and ½ cu. yd., Excavators often remove more material per hour than excavators of larger rated capacity. They travel fast — operate fast and are easily and quickly maneuvered even in the most restricted space.

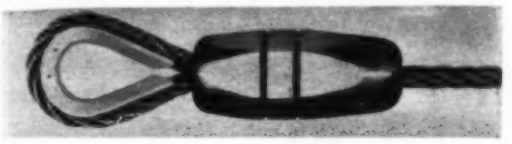
The *patented* crowd adds digging power for handling hard materials . . . makes possible easy and fast control of the dipper with larger yardage . . . cuts close to the line.

Hook roller construction prevents tipping stresses on center pin. Independent crawler control—self-cleaning crawler sprockets—full-floating shoe pins—grease impregnated bearings. Write for complete details.

INSLEY MANUFACTURING CORP
INDIANAPOLIS, INDIANA

INSLEY

WIRE ROPE CLAMP has double spiral splined inner surface to fit each strand and wire of rope it grips, thus making secure fastening. Gripping halves of clamp held tightly to rope by taper threaded nuts. Made of high tensile strength steel and available



in stock sizes for ropes ⅛ to ¾ in. Leaves no sharp wire ends nor projections to injure men working with rope. Joint made with "Safe Line" clamp may be quickly adjusted to proper tension without additional expense and may be used over and over. Holding power, perfect mechanical design, safety and economy are advantages claimed by makers. — **National Production Co., Detroit, Mich.**

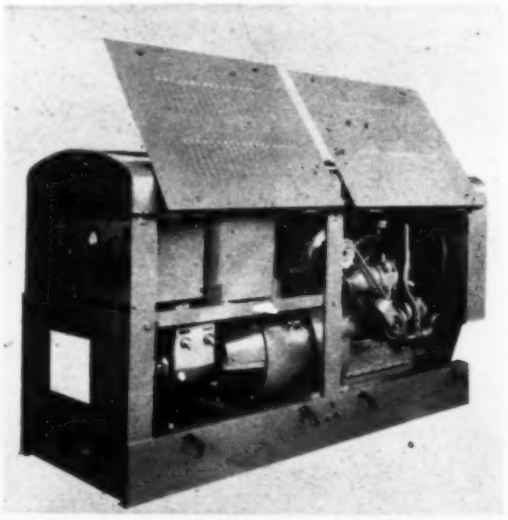
★ ★ ★

FOR REMOVING DEEP SNOW at high speed, Austin "99" motor grader is equipped with giant V snow plow and rear-mounted snow wing. Plow cuts under as it pierces drifts, elevating snow over long curved moldboards with minimum of resistance, finally throwing it outward to clear plow. Said to be carefully designed to avoid choking, wedging or digging

and to be heavily braced. Four runners assure extensive supporting surface. Plowing width, 9 ft. 2 in.; height at blade tips, 7 ft. 2 in. Weight equipped with scarifier, 3,200 lb. Snow wing is auxiliary, hydraulically controlled unit used for moving snow farther to side and for clearing up after plowing. By varying length of two telescopic shafts that support wide end of wing, angle of cut or tilt may be changed to handle various snow conditions. For light snow or when clearing up, wing can be lowered and used with regular moldboard to cover width of 18 ft. 4 in. Overall length of wing moldboard, 12 ft. 6⅜ in. Height of wing, low end, 20½ in.; high end, 40 in. — **Austin-Western Road Machinery Co., Aurora, Ill.**

★ ★ ★

DIESEL ENGINE DRIVEN ARC WELDER equipped with gasoline engine starting instead of conventional motor starter with storage batteries said to simplify use of diesel power by use of engine dependable in starting, simple, light and cheap, and speedy in operation. Gasoline engine used for starting welder is mounted above diesel engine and



started with hand crank. Cooling systems of both engines are connected, facilitating starting in cold weather. Welder said to cut fuel costs 33 to 86 per cent, depending upon type of fuel oil used. Generator used on welder is 300-amp. unit equipped with dual continuous control which makes possible independent adjustment of both voltage and current, thus providing right size and type of arc for all

Le Tourneau Turns to "FLEX-SET" PREFORMED YELLOW STRAND

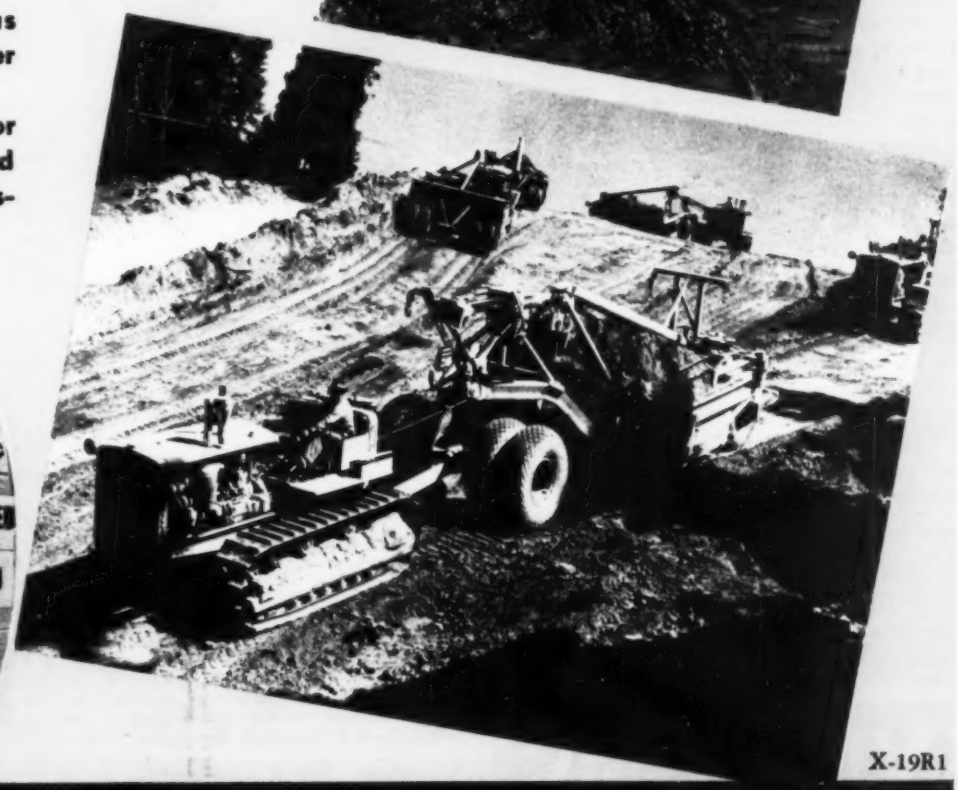
For economy, users of all kinds of machinery employing wire ropes can profitably follow the example of R. G. LeTourneau, Inc., who recently adopted "Flex-Set" Preformed Yellow Strand as standard equipment on all their famous "cable controlled" machines.

Of course, LeTourneau wants every machine to operate with greatest economy right from the start. Therefore, the decision to standardize on "Flex-Set" Yellow Strand was made only after many rigid tests, and observations right out on the job.

"Flex-Set" Preformed Yellow Strand is a super-rope for super-service, the highest grade product of a company that has made nothing but wire rope for 63 years.

Records of unusual performance are constantly being established by this marvelous rope in road building everywhere, as well as in practically every other industry.

Ask any B. & B. Distributor or Branch Office for full details and prices. There's one in every industrial center.



X-19R1

BRODERICK & BASCOM ROPE CO., St. Louis

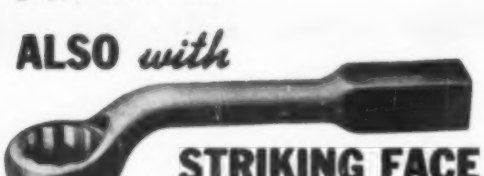
Factories: St. Louis, Seattle, Peoria *Branches:* New York, Chicago, Seattle, Portland, Houston

NEW
A SAFER STRUCTURAL WRENCH

FORGED FROM CHROME-MOLYBDENUM STEEL WITH 12-POINT OPENING FOR BOTH HEX & SQUARE NUTS

This new Williams' "Superrench" retains the general characteristics and dimensions of the popular "Structural" pattern but provides a Box Head instead of the conventional Open Head. Its 12-point opening insures a positive and slip-proof grip on both Hex and Square nuts — the *safest* wrench design possible. The handle has generous offset for maximum clearance and the usual tapered end for "lining-up." Furnished in 7 sizes for U. S. Standard Nuts, ⅞" to 1-¾". Drop-forged from tough, chrome-molybdenum steel, heat-treated and finished in gray, baked enamel.

ALSO *with*



STRIKING FACE

Adapted for heavy work in close quarters — for setting up large nuts and loosening "frozen" ones. Chrome-molybdenum steel, specially heat-treated to withstand shock loads. Finished in gray, baked enamel.

Ask your supplier, or write for literature

J. H. WILLIAMS & CO.
225 LAFAYETTE ST., NEW YORK

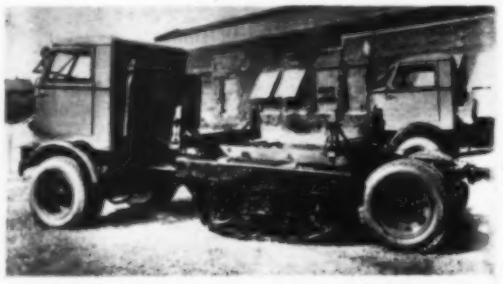
Headquarters for: Drop-Forged Wrenches (Carbon and Alloy), Detachable Socket Wrenches, Reversible Ratchet Wrenches, Tool Holders, "C" Clamps, Lathe Dogs, Eye Bolts, Hoist Hooks, Thumb Nuts and Screws, Chain Pipe Tongs and Vises etc.

WILLIAMS
SUPERIOR DROP-FORGED TOOLS
"SUPERRENCH"
(Chrome-Molybdenum)

jobs. Other features: Extra wide welding range, independent excitation, laminated magnetic circuit, high capacity, high efficiency and cool operation. Generator frame attached directly to diesel engine bell housing. Generator shaft connected to engine fly wheel by special type flexible coupling. Entire unit mounted on substantial channel frame.—**Lincoln Electric Co., Cleveland, Ohio.**

★ ★ ★

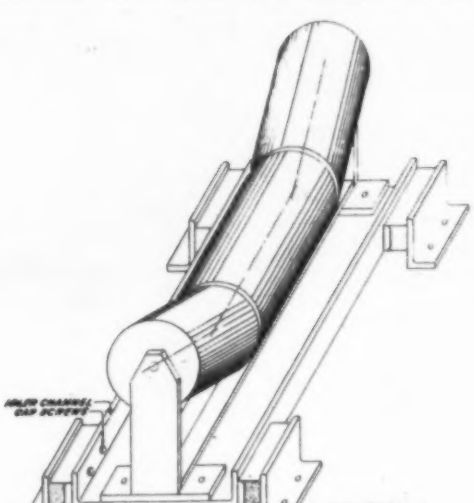
HEAVY-DUTY TRUCK, said to eliminate need for auxiliary equipment or rehandling of load in various types of hauling services, combines advantages of track and wheel operation without requiring operator to take time out for conversion of unit. Shift of lever causes instant change from wheel to track operation. When operating on pneumatic-tired



wheels drive is on front wheels. When operating on tracks, drive is on tracks and front wheels simultaneously. Quick conversion of unit made possible by hydraulic jack-knife lever unit which raises and lowers rear wheels. Rear wheels may be raised to allow 9-in. clearance. When drive is on wheels, clearance under traction unit is 7 in. Powered by Hercules 6-cylinder gasoline engine 4⅜x4¾-in. bore and stroke, or diesel engine, 4⅜x5¼-in. bore and stroke. Standard equipment includes four wheel hydraulic brakes, parking brake, electric lights and starter, tail and stop-light, shock absorbers, windshield wiper, two tow-eyes and complete tool kit. — **Linn Manufacturing Corp., Morris, N. Y.**

★ ★ ★

SHOCK IMPACT MOUNTINGS for conveyor idlers as a means of reducing belt conveyor wear permit entire belt, idler and frame to recoil from impact, recoil being absorbed by movement of rubber in mounting. Because rubber is in shear, not compres-

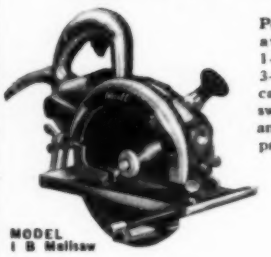


sion, it distorts easily and absorbs impact without damage to belt cover. Four mountings on each frame are fastened through angle iron base of mounting to conveyor "stringer." Metal face bar of all mountings is tapped and equipped with ½-in.-diameter S.A.E. heat-treated cap screws. Varying amounts of impact provided for by varying length of mountings. For belts 48 to 60 in. wide 4-in.-long mountings are sufficient for light impact. Mountings, 6 in. long, can take care of fairly severe impact. For unusual conditions 8-in.-long mountings may be used.—**B. F. Goodrich Co., Akron, Ohio.**

★ ★ ★

SAW-TOOTH BLADE for use on graders doing work in ice, snow and sleet and in other maintenance assignments, is special blade with sharpened edges and with series of teeth cut angling in lower edge. Main feature is angle of sharpened teeth which

TOOLS THAT SPEED UP YOUR WORK SAVE YOU MONEY!

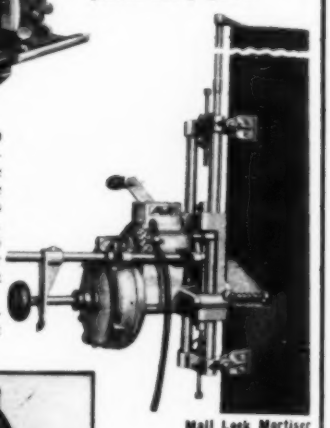


MODEL 1 B Mallsaw

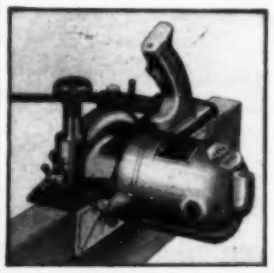
Powerful MALLSAWS are available in all sizes — 1-⅝", 2-½", 2-¾", 3-⅛", 3-13/16" and 4-⅝" cutting capacities. Each model has swiveling base for angle cuts and the MALL patented approved safety guard.

MALL Model D Electric Lock Mortiser. Cuts both the lock barrel mortise and face plate recess at the same time. You can mortise 45 to 50 doors per hour with this efficient tool.

Write for descriptive folder—no cost or obligation!



Mall Lock Mortiser



MALL DOOR PLANE

MALL Model 150-P Door Plane. Leaves a smooth finish after planing with or across the grain. Ten times faster than a jack plane. Also, surface planes for large flat surfaces.

MALL TOOL COMPANY
7101 SOUTH CHICAGO AVENUE CHICAGO ILLINOIS

The Clipper MASONRY SAW

CUTS ANY MASONRY PRODUCT

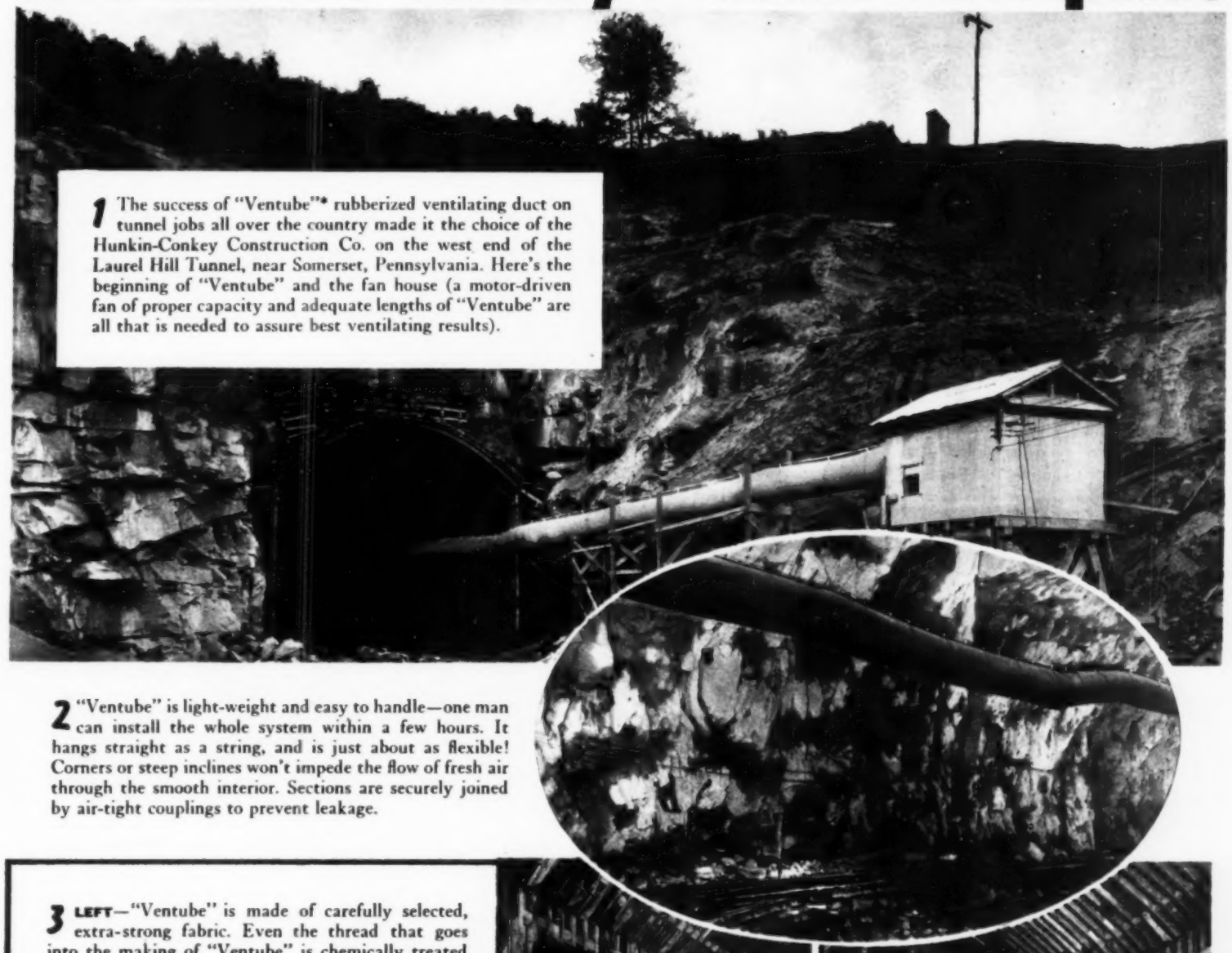
and at the same time, cuts the cost in half. The Clipper features the exclusive multiple cutting principle with hand and foot control making the cut in plain view of the operator.

USED FROM COAST TO COAST

Clippers are today in national use. On construction jobs the number of machines will range from 1 to 12. You'll find the Clipper working in the smallest and the largest manufacturing plants. Why? Because it saves its cost on every job.

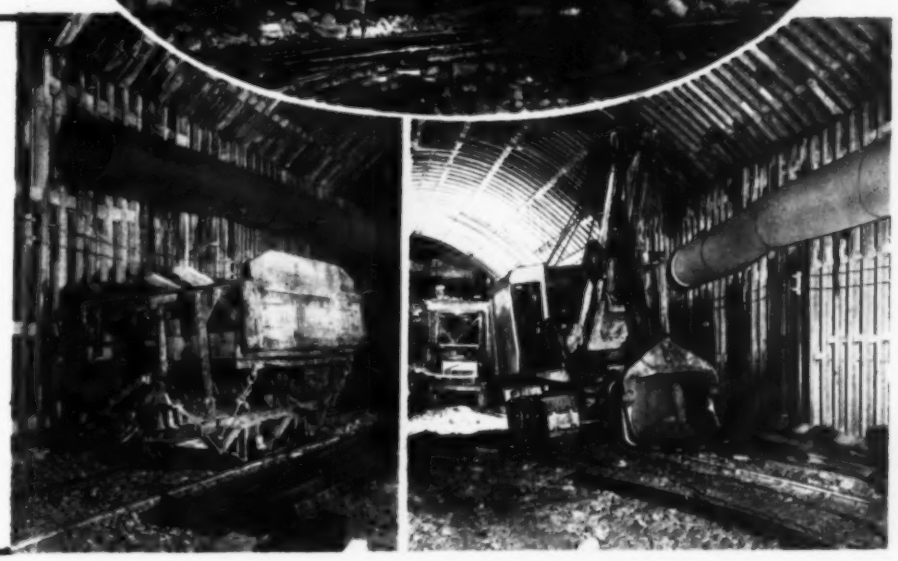
THE CLIPPER MFG. CO.
4030 Manchester, St. Louis, Mo.

VENTUBE* helps speed work on the new Pennsylvania Turnpike



1 The success of "Ventube"* rubberized ventilating duct on tunnel jobs all over the country made it the choice of the Hunkin-Conkey Construction Co. on the west end of the Laurel Hill Tunnel, near Somerset, Pennsylvania. Here's the beginning of "Ventube" and the fan house (a motor-driven fan of proper capacity and adequate lengths of "Ventube" are all that is needed to assure best ventilating results).

2 "Ventube" is light-weight and easy to handle—one man can install the whole system within a few hours. It hangs straight as a string, and is just about as flexible! Corners or steep inclines won't impede the flow of fresh air through the smooth interior. Sections are securely joined by air-tight couplings to prevent leakage.



3 **LEFT**—"Ventube" is made of carefully selected, extra-strong fabric. Even the thread that goes into the making of "Ventube" is chemically treated to resist fungus growth. Then the fabric is both coated and impregnated with rubber to resist acid, gases, fungus and moisture! And "Ventube" is as strong in the warp direction as in the filler so that concussions can't hurt it!

4 **RIGHT**—"Ventube" gets right up to the heading, where you need plenty of fresh air most of all! During blasting the sections nearest the face easily slide back to prevent damage from flying rocks. Immediately afterwards "Ventube" slides forward again, bringing you clean, pure air from the outside.

• • •

Install a few sections of "Ventube" in your toughest working. See how easy it is to handle—how it helps speed up work and cut costs! Write du Pont today!

DU PONT VENTUBE

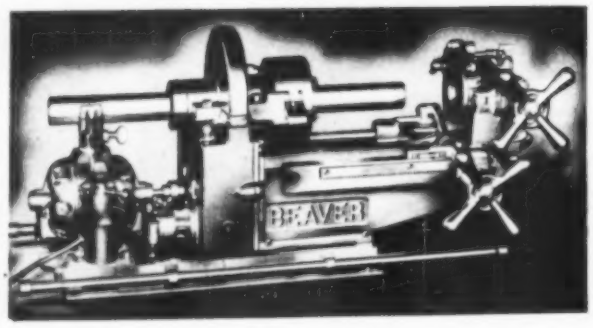
THE FLEXIBLE VENTILATING DUCT

E. I. DU PONT DE NEMOURS & COMPANY (INC.)

"FABRIKOID" DIVISION • **FAIRFIELD, CONNECTICUT**

**"Ventube" is du Pont's reg. trade mark for rubber impregnated flexible ventilating duct.*

The A-B-C of Pipe and Bolt Threading



Beaver Model-A

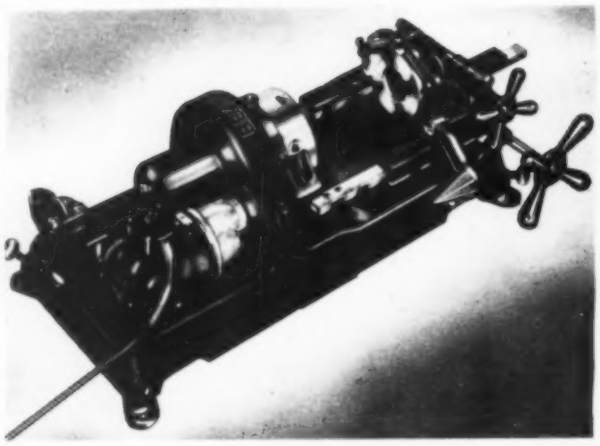
A Heavy-duty High-speed Portable Pipe and Bolt Machine. Range ⅛ to 2-inch—up to 12-inch with geared tools and drive shaft. Eight machines used on Boulder Dam; others at Grand Coulee; Bonneville; Shasta; Tygart, Parker, Marshall Dam and others. Used by firms like Stone and Webster; Pacific Constructors; Morrison-Winston-Utah Co; Merrill-Chapman-Scott; Sanderson-Porter; Columbia Construction Co; Consolidated Builders; Costello Engineering Co; Guthrie-Marsh-Peterson; and many others. From $309.50 up—depending upon accessories.

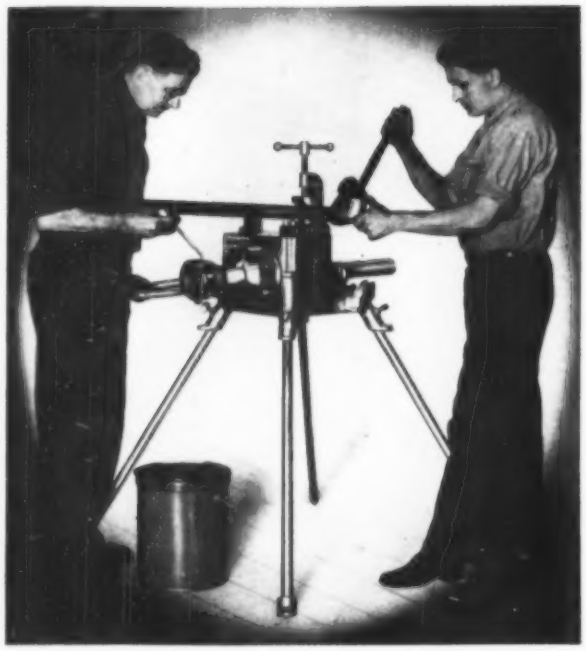
Write for Bulletin-A

Beaver Model-B

A light-weight, utility pipe and bolt machine combining many features of Model-A with the easy portability of Model-C. Ideal for contractors. Range ⅛ to 2-inch—up to 8-inch with drive shaft and geared tools. Complete machine, die heads, legs, etc., packed in one box. From $217.50 up—depending upon accessories.

Write for Bulletin-B





Beaver Model-C

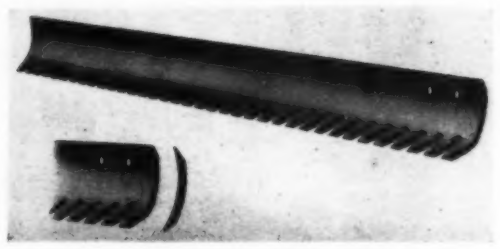
A sturdy little Power Unit that converts hand pipe tools into power tools from ⅛ to 8-inch. Threads bolts up to 1½-inch. Weight 150 pounds. Fully enclosed gears; anti-friction bearings; automatic safety chuck wrench ejector; safety latch; universal motor that develops 1.6 H.P. 110 or 220 volt; can be used by inexperienced workmen; also useful as a winch or cable puller. From $127.50 up—depending upon accessories.

Write for Bulletin-C

Write for complete Catalog of Beaver Pipe Tools (Hand and Power)—Cutters—Threaders—Reamers—Beveling and Grooving Tools, Pipe and Bolt Machines.

BEAVER PIPE TOOLS

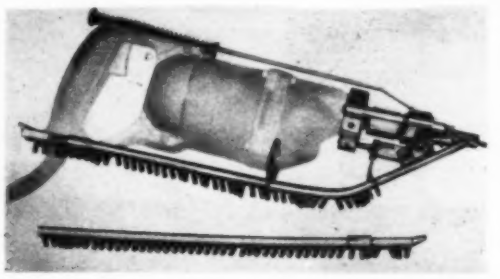
1100 DANA AVE. ***Quality Tools—Since 1900*** **WARREN, OHIO**



cut and score grooves parallel with direction of travel and number of teeth in each blade. Makers claim that blade will successfully remove hazards caused by slippery and rutted streets and highways. One trip over icy road will roughen up roadway sufficiently to reduce skidding hazard to minimum. Two or more trips said to loosen packed snow and ice well enough to enable regular grader or snow plow to remove frozen material entirely. Also useful in tearing up black-top, tar and macadam roads and in maintaining dirt and gravel roads by eliminating all washboard corrugation, ruts, ripples, chatter bumps, hollows and other irregularities.—**Shunk Mfg. Co., Bucyrus, Ohio.**

★ ★ ★

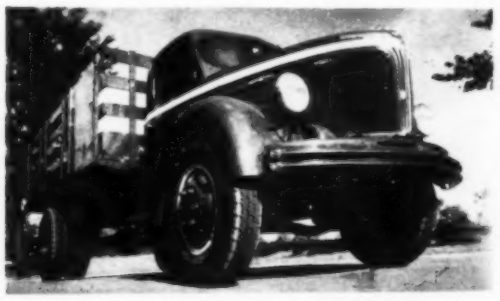
MECHANICAL FEEDER for portable power screwdrivers holds screws in magazine from which they are delivered mechanically, one at a time as needed, into chuck holding screw in position for driving. When magazine on driver becomes empty,



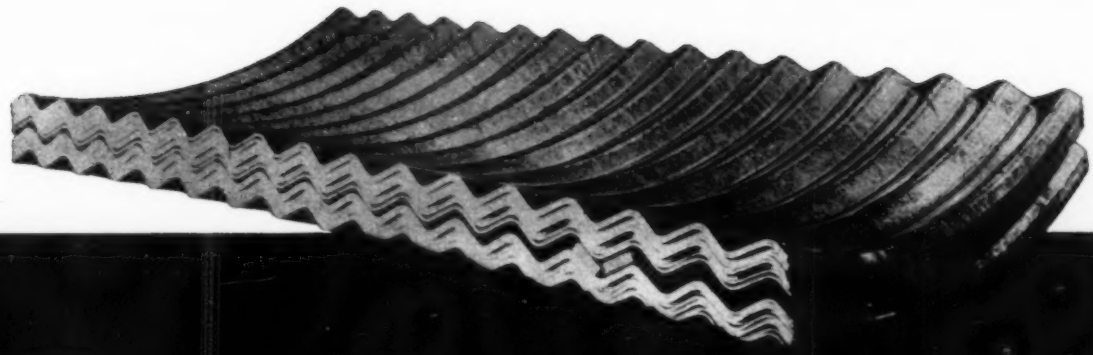
refilling said to be easy, as operator is provided with auxiliary magazines from which screws are easily transferred. Adjustable limit control insures driving screws to desired degree of tightness. Attachment may be had for any size or type of screw that can be economically hopper fed and adapted to any type of power driver—electric, air or flexible shaft. Holds at one loading of standard magazine 45 10-32x½ round head screws. Capacity for other sizes determined by head diameters. Weight, 1¼ lb.—**Akron Automatic Machine Co., 100 Beech St., Akron, Ohio.**

★ ★ ★

1940 TRUCK LINE will include five new models, capacities from 1½ to 6 tons. Features: (1) More loading space per inch of wheelbase; (2) three standard wheelbases—120 in. for 9-ft. body; 145 in. for 12-ft. body; 165 in. for 15-ft. body; (3) more weight on front axle, thus producing better weight dis-

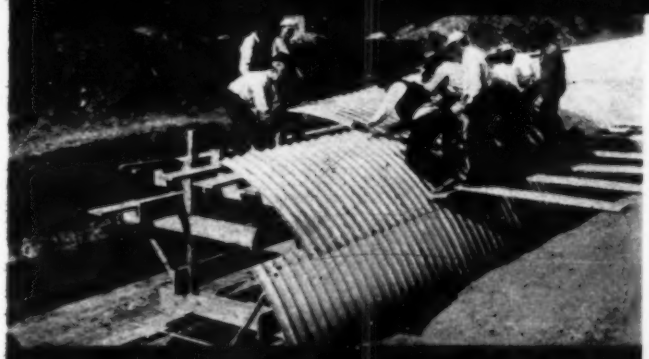


tribution under load and preventing tire wear; (4) shorter turning radius: for instance, 23 ft. 4 in. turning radius on 145-in. wheelbase (12-ft. body length) 1½-ton truck; (5) "Gold Crown" engine further improved and re-engineered for longer life and to handle present-day fuels more efficiently and economically; (6) interchangeability of mechanical units—engines, transmissions and rear drives; (7) all-steel cab with crank-operated ventilating cowl and windshield, wider and deeper cushions, comfortable back cushion, ample leg room and wide in-and-out doors; (8) frames with deeper side rails and wider flanges: for example, 1½-ton model has frame 8⅞ in. deep with 3-in. flange top and bottom.—**Reo Motor Car Co., Lansing, Mich.**



Speed work... Trim costs

WITH ARMCO MULTI PLATE



Time and money were saved in constructing this large outfall sewer by using a Multi Plate arch set on a floor of concrete. No costly formwork or heavy equipment was needed.

By using Armco Multi Plate Pipe for this 165-inch diameter inverted siphon, the contractor saved $6000 and completed the job in half the time estimated for other materials.

An unskilled crew of 6 men erected this 13-foot span Multi Plate bridge in just 5 hours. The only tools required were six spud wrenches, four hand hooks and some 6 x 6 braces.

FOR BIGGER PROFITS IN 1939 meet the demand for large drainage structures with Armco Multi Plate. You'll land more jobs, complete them in half the time, and cut your overhead costs to rock bottom.

How are these results possible with Multi Plate? Chiefly because the heavy-duty corrugated iron plates come to your job ready for quick assembly. Bolting them together to fit specifications is almost as simple as tightening a wheel on your car. No skilled labor, costly formwork or heavy machinery is needed. And once the structure is finished, it can immediately be backfilled with earth. This shortens construction time to hours or days and assures "fool-proof" results at low cost . . . even in the coldest weather.

No wonder successful contractors everywhere are discovering that "there's more profit in a Multi Plate job." Find out for yourself this year. Plates are quickly available for full-round structures up to 15 feet in diameter; and for arches with spans up to 25 feet. See your local Armco representative or write directly to Armco Culvert Mfrs. Assn., Middletown, Ohio.

Armco MULTI ARMCO PLATE

MULTI PLATE

JACKSON
SMALL TOOLS

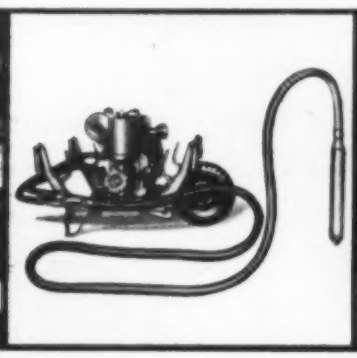
AND
POWER PLANTS for SMALL TOOLS

—with rigid handle

—in action

—with 12' flexible handle

Jackson VS-E1's are "tops". You can count on them when the going is rough. An electric vibrator for operation on 110 V 3 phase, 60 cycle A.C. See the three phase or single phase power plants illustrated below.



The Jackson Hydraulic is an efficient small tool—one every concrete contractor should have. Gas engine driven, this 2-¾" diameter vibrator has NO flexible shafts, consequently a greater period of trouble-free operation can be expected. Interchangeable heads for vibrating, grinding or drilling make it a versatile unit.

Model V-1

Model WS-4

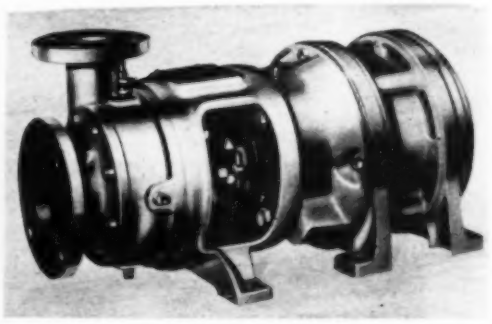
Model H-15

All Jackson Portable Power plants provide either three phase, 110 V A.C. or single phase 110 V A.C. Run reliable three-phase electric tools or operate any of your small single phase tools. Jackson Power Plants can be used for floodlighting—so important on rush jobs or in case of emergency. Run your saws, drills, grinders, fans, pumps or any of the many other Universal small tools.

Write For Our New Folder on Power Plants and Small Tools

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

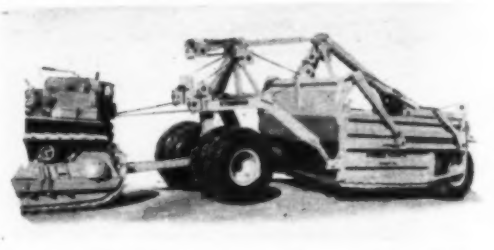
MOTOR PUMP designed for all types of general service is built in sizes for delivery of from 5 to 1,000 g.p.m. and heads up to 500 ft. Constructed



as unit, with pump impeller mounted directly on shaft of electric motor drive. Entire unit inclosed in housing which requires no baseplate or foundation and may be bolted down for operation in any position.—**Ingersoll-Rand Co., 11 Broadway, New York City.**

★ ★ ★

23-CU.YD.-CAPACITY CARRIER SCRAPER, designed especially to take advantage of two tractors' horsepower for loading and one in hauling. Lightweight patented box-beam construction. Features: Large, single bucket; alternately curved and straight cutting blades placed at plow-like natural suction



digging angle for easier loading; positive "wipe-out" ejection tailgate; large sheave arrangement to reduce cable strain, to facilitate load handling and to keep dirt out of sheaves and cable. Bowl, 10 ft. deep, 10 ft. wide and 5 ft. high. Eight 18x24-in. pneumatic tires. Power control unit procures regulated fractional inch cutting up to 12 in. and spreads loads in any required thickness up to 18 in.—**R. G. LeTourneau, Inc., Peoria, Ill.**

★ ★ ★

TRANSPARENT GAGE COVER threads on to gage case and is said to eliminate breakage of glass fronts on these instruments. Made of transparent plastic with tensile strength of about 5,000 lb. and

compression strength of approximately 15,000 lb per square inch. Gage cover opens up gage dial, assuring easy reading and also makes case moisture- and dust-proof. Improves appearance of gage. Available on 4½ and 6-in. Phenol Case Duragages. —**Ashcroft American Gage Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.**

FLEXIBILITY . . . TOUGHNESS . . . DURABILITY

. . . ELASTICITY . . . STRENGTH . . .

Archimedes took no chances

with his self-made block and tackle when he offered "To do the work of a hundred men" with it . . . because he had designed and constructed his equipment with a definite purpose . . . he had tested its ability, and consequently was sure what the results would be.

NEVER A MATTER OF CHANCE

The quality of "HERCULES" (Red-Strand) Wire Rope begins with the fixed determination to produce a product that will be *consistently* long lasting . . . dependable . . . economical. It involves the use of acid open-hearth steel wire, correct design, modern manufacturing methods, and long experience—all double-checked by rigid tests and exacting inspections from start to finish. The result is a wire rope that *you* can rely on—just as thousands of others are doing.

With wire rope, it pays to use the best, for therein is the way to increased safety, longer service and more continuous operation. You take no chance when you specify "HERCULES"—the wire rope that has proved its ability by its service record.

In order to be suitable for all purposes, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type we consider best for your conditions.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS • ESTABLISHED 1857

5909 KENNERLY AVENUE • • ST. LOUIS, MO.

New York	90 West Street	San Francisco	520 Fourth Street
Chicago	810 W. Washington Blvd.	Portland	914 N. W. 14th Avenue
Denver	1554 Wazee Street	Seattle	3410 First Avenue South

For Steady, Trouble-Free Service on All Types of Pneumatic Tools!

"DIXON"

AIR HAMMER COUPLINGS

These are the couplings that contractors say have no equal for dependable, low-cost service. Designed for use on all makes of hand hammers and rock drills. Simple construction . . . strong and durable . . .easily installed. Cadmium plated — rustproof. Compact Type, Style WLD-7, ½" and ¾"; Heavy Type, Style WHD-9, ¾" and 1".

"G J-DIXON"

GROUND JOINT
AIR HAMMER COUPLINGS

The most efficient couplings ever devised for air equipment. No leaking or lost washers. Soft-to-hard metal seat forms permanently tight seal, regardless of wear. Exceptionally strong and durable. Cadmium plated — rustproof. Furnished with either male or female spud. Compact type, Style XLD-41, ½" and ¾"; Heavy Type, Style XHD-52, ¾" and 1".

"G J-BOSS"

GROUND JOINT
AIR HAMMER COUPLINGS

Except for stem and clamp, these are exactly the same as the "G J-DIXON" Air Hammer Couplings described above. The special steel stem of the "G J-BOSS" has a collar to engage the extending fingers of the sturdy malleable iron "BOSS" Clamp. Cadmium plated — rustproof. Compact Type, Style XLB-61, ½" and ¾"; Heavy Type, Style XHB-72, ¾" and 1".

"BOSS"

AIR HAMMER COUPLINGS

Generally, these are the same in design and construction as "DIXON" Air Hammer Couplings, with the same steel spud and malleable iron wing nut. Like the "G J-BOSS", however, they are equipped with the extra strong malleable iron "BOSS" Clamp, the fingers of which engage a collar on the steel stem.

Both the "BOSS" and "G J-BOSS" are used for the most severe types of service. Application of the "BOSS" Clamp eliminates all possibility of blow-offs.

Stocked by leading rubber manufacturers and jobbers.

Write for Descriptive Folder

DIXON
VALVE & COUPLING CO.

MAIN OFFICE AND FACTORY

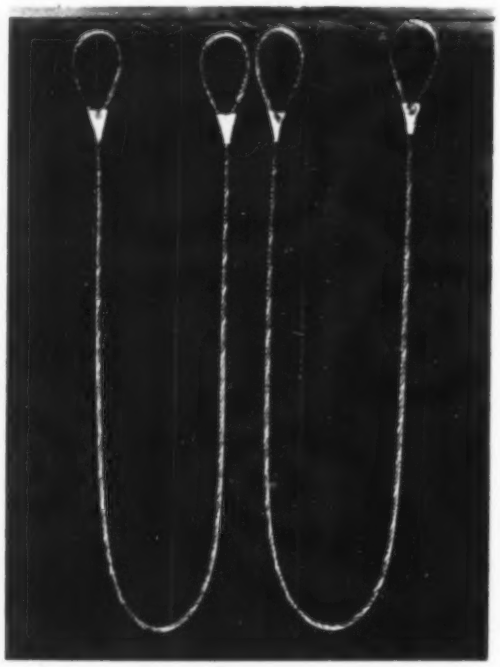
PHILADELPHIA

Branches: Chicago • Birmingham • Los Angeles • Houston

TAR KETTLE named "Helhete" made in capacities from 60 to 300 gal., has low center of gravity and easy loading height of 45 in. It is mounted on elliptic springs supported by drop axle on 6.00x16-in. 6-ply rubber tires. Sides, top and bottom of heavy sheet metal are mounted on heavy, reinforced frame of angle iron with all seams electric welded. Insulation of cast (asbestos base) fireproof and heat retaining material 1½ in. thick that is said not only to save fuel but to produce supply of hot tar in 30 min. Fuel line is of copper. Fuel consumption said to be as low as 2 qt. per hour. Water and fireproof covers and heavy metal fire pot may be removed for easy cleaning.—**Chausse Equipment Manufacturers, 80 E. Jackson Blvd., Chicago, Ill.**

★ ★ ★

WIRE ROPE LOOP-EYE SLING, said to assure safety for workman's hands and higher efficiency in handling rope is called "Y-Guard" sling because of its patented, tapered steel ferrule which eliminates protruding ends or wire seizing of conventional eye splice. Steel ferrule streamlines sling so that it can easily be pulled out from under loads, making it safe to handle. Made of Macwhyte preformed wire rope. Loop eyes easily encircle crane hooks.—**Mac-Whyte Co., 2906 14th Ave., Kenosha, Wis.**



★ ★ ★

NEW LINE OF WRENCHES, called Bonney Zenel Tu-Type, are made of chrome-vanadium steel in 13 sizes and have openings ranging from ⅜ to 1 7/16 in. Combining open-end and box wrench, these tools permit using end most applicable to job. Adaptable to work on carburetors, generators, manifolds, clutch and starter work as well as general service on trucks, buses and tractors.—**Bonney Forge & Tool Works, Allentown, Pa.**

Answers to your problems in structural engineering always at your finger tips

EVERY man concerned with the design and construction of civil engineering structures of any type should have these practical books with their helpful tables, diagrams, reference data, best methods and details.

Hool and Kinne's

Structural Engineers' Handbook Library

6 Volumes—3575 pages—fully illustrated

THE most valuable library obtainable for any man concerned with the design and construction of civil engineering structures of any type.

Under the general editorship of George A. Hool, formerly Professor of Structural Engineering, University of Wisconsin; and W. S. Kinne, Professor of Structural Engineering, University of Wisconsin, Editors-in-Chief of the Library, *Sixty-Six* of the leading, practical operating structural engineers of the United States and Canada give you the very cream of their knowledge of structural engineering.

They give you six well bound, fully illustrated volumes, containing 3,575 pages of practical, authoritative information covering every phase of structural engineering from foundation and substructure work to the completed erection.

Every man concerned with the design and construction of civil engineering structures of any type should have these practical books with their helpful tables, diagrams, reference data, best methods information and details. The six books are:—1. Foundations, Abutments and Footings. 2. Structural Members and Connections. 3. Stresses in Framed Structures. 4. Steel and Timber Structures. 5. Movable and Long-Span Steel Bridges, and, 6. Reinforced Concrete and Masonry Structures. With these books on hand you cannot make mistakes.

By placing this Library on your bookshelf you are putting within arm's reach years of actual first rate experience with structural problems. Do not forget either, that these men are all EXPERTS in their lines.

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CM. 11-39

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use

ALL-ALUMINUM OR BRONZE WINDOWS — **The Kawneer Co.**, Niles, Mich. (12-pp., illustrated.) Devoted to description and illustration of Sealair windows factory fitted and assembled for use in schools, apartments and commercial, public and monumental buildings. One page illustrates and describes construction features: (1) Head—all-aluminum sash and frame interlocked with felt cushion, sealing out air and weather; (2) meeting rail — double contacts, felt-to-metal and metal-to-metal, between strong tubular rails; (3) side jamb—spring weathering guides assure protection against wind, weather and rattling. Information, in brief, on other Kawneer products: rustless metal screens, storm sash, doors and architectural work.

★ ★ ★

WELDING IDEAS FOR LOW COST MAINTENANCE —**Lincoln Electric Co.**, Cleveland, Ohio. (16 pp., illustrated.) A new bulletin, "101 Welding Ideas for Low-Cost Maintenance," illustrates and describes a wide variety of money-saving repair, fabrication and structural applications of arc welding. Case studies of actual maintenance jobs explain just how general repair work of broken and worn parts—both structural and mechanical—also fabrication of replacements, piping, jigs, fixtures, etc. is done by the electric arc process.

★ ★ ★

CARE OF PORTABLE ELECTRIC TOOLS—**Black & Decker Manufacturing Co.**, Towson, Md., (12 pp. illustrated.) Booklet, "The Proper Care and Maintenance of Portable Electric Tools" gives helpful hints, not only on care and maintenance, but also on methods of properly grounding to protect the operator, currents, proper sizes of extension cable and pointers on what to look for when a tool fails to operate. The book is a useful guide for the portable electric tool user.

★ ★ ★

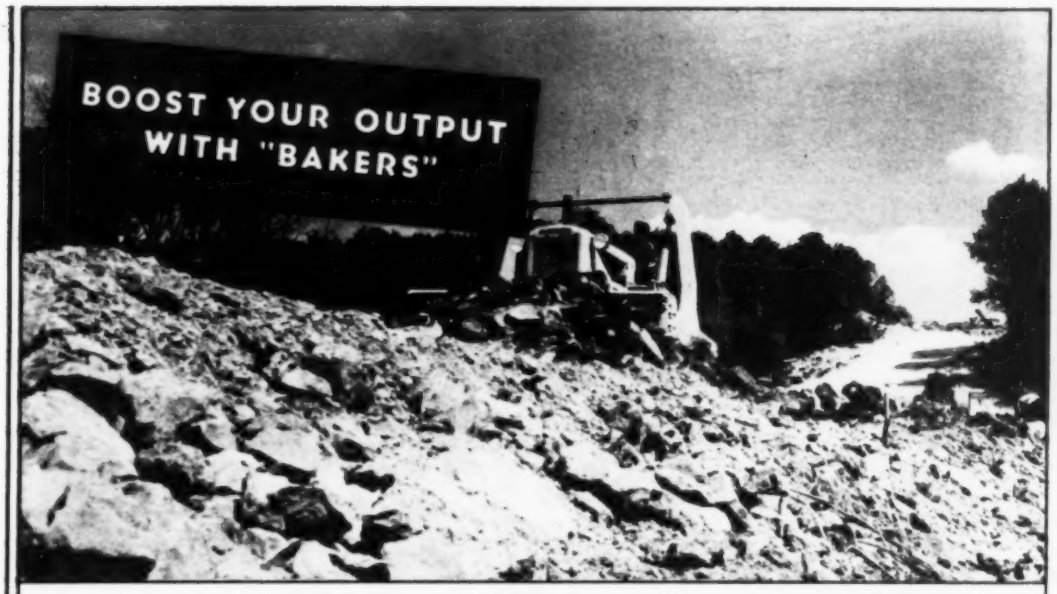
WATER-LUBRICATED PUMP — **Peerless Pump Division,** Food Machinery Corp., 301 W. Ave. 26, Los Angeles, Calif. (4-p. bulletin printed in three-colors.) Shows cross-section of entire pump assembly, revealing flow of water through bowls and method of sealing impellers by double seal. No oil used below surface in this type of pump. Entire shaft supported by cutless fluted rubber bearings rigidly fixed in bronze spiders to eliminate gyration and vibration. Describes service of water-lubricated pumps in capacities ranging from few gallons per minute to more than 10,000 g.p.m.

★ ★ ★

LIGHT-DUTY LINER PLATES—**American Rolling Mill Co.**, Middletown, Ohio. (4-p. folder, illustrated.) Data of interest to tunnel builders on liner plates for small diameter tunnels which are said to assure safe structural strength, savings on material cost and ease of handling. Photographs and schematic drawings used for illu tration. Tables give approximate weights of plates in standard gages and diameters and other properties.

★ ★ ★

ROLLER IMPROVEMENTS — **Hercules Co.**, Marion Ohio. (4-p. bulletin illustrated.) Entitled "More About Ironeroll," bulletin is intended as supplement to general Catalog No. H-3801. It details six points designed to prove efficiency and value of roller and lists two improvements: (1) Old style bevel reversing gear for controlling forward and reverse movement of roller has been replaced by spiral tooth gears for smoother, quieter and longer operation; (2) alloy steel, cut teeth, heat-treated gears. Added advantage: engine hood hinged for easy handling by operator, instead of being made in one piece as formerly.



Here's a Baker Gradebuilder on a Model "S" A-C Tractor working on the famous Pennsylvania Turnpike Highway. Connell & Laub, contractors, Dayton, Ohio.

BAKER BULLDOZERS AND GRADEBUILDERS

When you purchase a Baker Bulldozer or Gradebuilder, you have a right to expect it to be your faithful servant. You do not want it to balk where there's hard going. It should be ready to tackle any job and finish it.

Baker Bulldozers and Gradebuilders are built to handle any jobs you give them. Their steady performance means greater output of finished work—getting every ounce of performance out of your tractor.

Hydraulic operation on Bakers is easy, smooth and convenient. Operators prefer them because they "handle" better and get results faster. With the many exclusive features now available on many Baker models, you just can't afford to operate without them.

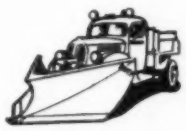
One of the many Baker Hydraulic Scrapers owned by the North Carolina State Highway Commission. Note the over-capacity load this Scraper is getting.

Ask for Bulletins on Bulldozers, Scrapers, Snow Plows and other Baker Products.

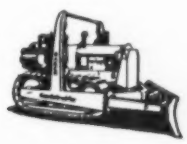
HYDRAULIC SCRAPERS

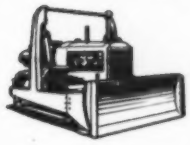
Earth movers who use Baker Scrapers are getting more capacity loads quicker and with less power. The flat digging angle and other draft-reducing features are cutting earth-moving costs substantially and making grading jobs simpler to handle. Baker Scrapers come in 3, 5, 8 and 10 cu. yd. capacities for tractors of 25 h. p. up.

THE BAKER MFG. CO.
568 Stanford Avenue
Springfield, Illinois



BAKER
TRACTOR EQUIPMENT
SNOW PLOWS • SCRAPERS • MAINTAINERS
BULLDOZERS • GRADEBUILDERS • ROOTERS





SKILSAW DRILLS
are specially powered for all wood boring and drilling work!
● Drilling up to 2 in. holes in hardwood is easy work for SKILSAW DRILLS because they have extra power and are built to do tough jobs, quickly and well! Builders use them for drilling holes up to 18 in. deep . . . on projects of every type, in mine construction work, truss roof construction, in building coal and ore docks, roundhouses, dam superstructures, in bridge construction for railways and highways, etc.
Wherever wood boring or drilling is done, SKILSAW DRILLS produce more work . . . yet their price is no higher and they cost less to maintain.
21 POWERFUL MODELS
a size for every need!
SKILSAW Cuts Costs
on every kind of sawing job!
● Test SKILSAW on your toughest sawing jobs and you'll see why it is more for your money . . . why it will save you half the sawing cost on all your joists, form lumber, roof sheathing, etc.
SKILSAW saws faster, easier, deeper on any kind of job. It is lighter, better balanced, more convenient to handle. It is engineered to give you many years of trouble-free service. No other saw can give you all of these profit-making features.
9 MODELS
FOR WOOD, METALS STONE AND COMPOSITIONS
SKILSAW
SAVE MONEY IN EVERY INDUSTRY!
PORTABLE ELECTRIC TOOLS
SAWS · DRILLS · BELT SANDERS · DISC SANDERS · GRINDERS · BLOWERS

SKILSAW, INC., 5045 Elston Ave., Chicago
36 East 22nd St., New York • 182 Main St., Buffalo • 32 Brookline Ave., Boston • 15 S. 21st St., Philadelphia • 2124 Main St., Dallas • 918 Union Street, New Orleans • 1233 South Flower Street, Los Angeles • 2065 Webster Street, Oakland • 29 North Ave., N.W., Atlanta • Canadian Branch: 85 Deloraine Ave., Toronto.

• Sold by leading distributors of mine, mill, hardware and contractors' supplies.

WHEELBARROWS, CARTS, SCRAPERS — **Jackson Manufacturing Co.**, Harrisburg, Pa. (48 pp., illustrated.) Describes and illustrates company's line of contractor's wheelbarrows, concrete carts, drag scrapers, salamanders, mortar pans and mortar mixing boxes. Wheelbarrow trays are of pressed steel, free from laps or rivets and legs are of steel channels with special shoes. Both wood and all-steel frames. Narrow, deep trays with front end narrowed for pouring. Pneumatic tired or all-steel wheels. Stone and brick barrows, Concrete carts have drop axles and pneumatic tired wheels. Salamanders for heating new buildings are available with sheet steel covers and ash pans.

★ ★ ★

WIRE ROPE—**Hazard Wire Rope Division,** American Chain and Cable Co., Wilkes-Barre, Pa. (131 pp., 4x6¾ in. size, illustrated.) Supplies in compact form catalog data and basic information regarding wire rope, including materials and grades, constructions, lay of strand, preforming, rope centers and coverings. Suggestions on uncoiling and unreeling, proper working loads, sizes of sheaves and drums. Rope is available for wide range of services including hoisting, haulage and elevator. Types include regular, preformed, flattened strand, non-rotating, special flexible, armored, galvanized (for guys), bridge cable. Also wire rope slings. One section is devoted to splicing and socketing of wire rope.

★ ★ ★

Small Tools FOR MODERN CONSTRUCTION

(Continued from page 42)

nearest to the job and quickest in deliveries.

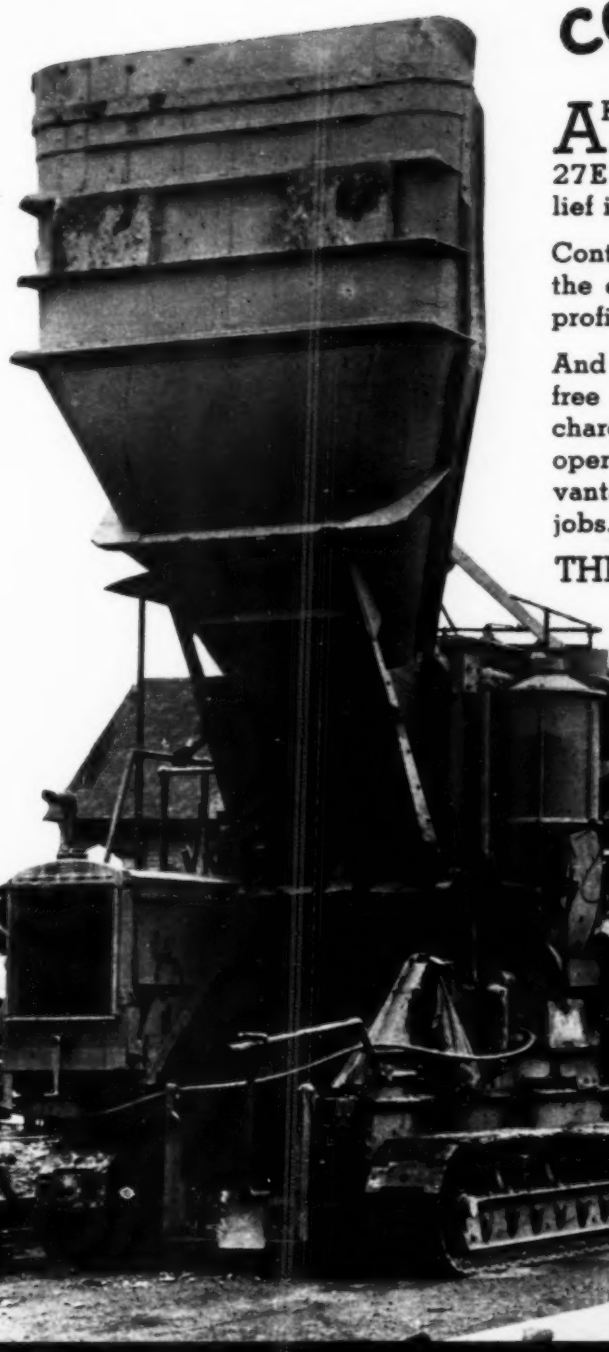
While the average job can be set up with centralized tool storage, the elimination of waste effort and lost time makes it advisable to decentralize tool distribution on any job spread over a large acreage. In such cases, however, complete maintenance facilities should be provided at a central location from which the various tools are initially distributed.

In one $6,000,000 project, for instance, where more than a dozen buildings were spotted over a 60-acre site, a blacksmith shop and maintenance shop were established next to the central storehouse, with two welders, two millwrights, one electrician and helper and a blacksmith with two helpers. With this setup it was possible to meet virtually all construction needs. Cable clamps and cable slings for handling steel were made right on the job. Picks and other equipment were redressed and repointed and general equipment fully maintained.

A large tonnage of structural steel was involved and bolts for temporary erection represented a considerable item. Four carloads of bolts were used, and a complete setup for rethreading made it possible to use most of them twice and three times over, so that the aggregate bolt tonnage was cut to less than half of what it might have been.

(Continued on page 98)

Another MULTIFOOTE for THE MIDWEST CONSTRUCTION & ASPHALT CO. CHICAGO

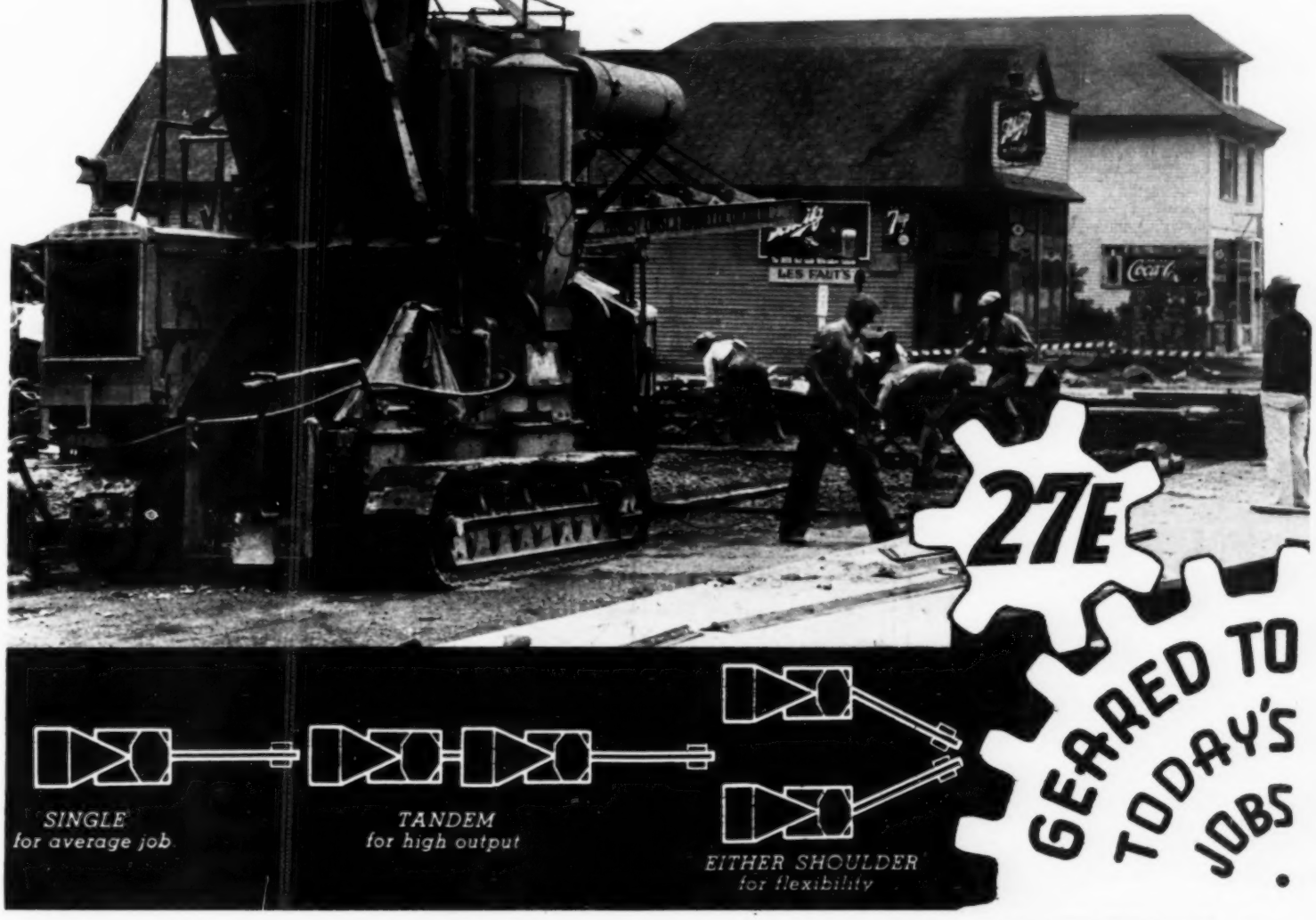


AFTER trial last year of a larger paver, The Midwest Construction & Asphalt Company, Chicago, have purchased another 27E MultiFoote. This is a significant example of the widespread belief in the basic economy of the lighter, more flexible 27E pavers.

Contractors have found that MultiFoote speed, in conjunction with the elimination of extra finishing equipment, means faster, more profitable jobs.

And MultiFoote 27E's are your guarantee of dependable, trouble-free service — The No Pressure Water Tank; fast charge and discharge, wider boom swing; rapid bucket travel and independently operated bucket doors are only a few of the many MultiFoote advantages. Write today for complete details on *the* paver for today's jobs.

THE FOOTE COMPANY, INC., Nunda, New York



Cranes Take Fast, Hefty Swings with a Williams Bucket on the Boom!

★ Cranes have limits in lifting power and digging radius. Hanging TOO big a bucket on the boom often defeats its own purpose!

You want FAST digging, and BIG payloads — and Williams Buckets help you get the best performance from your cranes because Williams welded construction and design eliminate excess weight without sacrificing digging power or durability! You get the most out of your cranes with the right Williams Bucket on the boom or dragline!

A tricky fight manager once stuffed a lot of horseshoes into his fighter's gloves. But he overloaded them so the poor pug could barely lift his hands — and was an easy knockout. *Don't handicap your cranes the same way!*

Send for free bulletins covering the Williams line of Power-Arm, Multiple-Rope, Power-Wheel, Hook-On and Dragline Buckets. Distributors located in all parts of the country for prompt field service.

THE WELLMAN ENGINEERING CO.
7017 CENTRAL AVE. CLEVELAND, OHIO

WILLIAMS *Buckets* built by WELLMAN

Want Daytime Efficiency on that Night Job?

National Carbide V-G Light — 8,000 Candle Power without extension — 16,000 Candlepower using extension. Easily handled by one man — No wires, No carbide wasted.

National Carbide V-G Handy Light — 1500 Candle Power — weighs only 37 pounds fully charged.

National Carbide Lanterns — signal of red, blue or green — ideal for emergencies.

NATIONAL CARBIDE CORP.
LINCOLN BUILDING • NEW YORK

Send information on lanterns or V-G Lights with absolutely no obligations.

Name .....
Address .....
City ..... State .....

THE OTHER PUMPS QUIT

Results mean more than words. Talk is cheap and anyone can make a lot of unproved claims. But on the job a pump must do its own talking. Try out a G & R pump and then **you** be the judge.

GORMAN-RUPP PUMPS

AGAIN THE CONTRACTORS BOUGHT GORMAN-RUPP

On the new Shore Parkway project at Brooklyn two centrifugal pumps one an 8-inch and the other a 4-inch, clogged and quit. Two "Can't Clog" G & R 6-inch pumps replaced the quitters and for weeks pumped 24 hours per day.

Gorman-Rupp Pumps Can't Clog. They are not quitters. That's why MORE CONTRACTORS ARE STANDARDIZING ON GORMAN-RUPP PUMPS THAN ANY OTHER MAKE. They will pump MORE WATER and pump MORE HOURS at LESS COST.

Let a Gorman-Rupp Pump prove these statements. Phone our nearest distributor for a trial pump.

THE GORMAN-RUPP CO. Mansfield, Ohio

(Continued from page 96)

Large tool boxes of a sturdy type, previously described, were transported to strategic locations over the site, and tools were distributed to workmen direct from these boxes.

Cardboard tags of several different colors were employed, together with conventional brass tool checks carrying each workman's number. As the tools were issued, the check and colored tags representing the particular tools issued to him were hung up on the checkout board. As individual tools were returned or additional tools required, the colored tags were changed to maintain a continuing check on just what each man had. Foremen and pushers were the only persons authorized to release power equipment and they were responsible for noting the issuance and return of same.

Special Precautions

Of all construction equipment which must be kept under close control to avoid unnecessary costs, none is more aggravating than tarpaulins. Unless extreme diligence is maintained in handling them, substantial losses are likely to occur. After careful study of this problem, several rules of practice have been recognized as all important. Great care must be given to the design of tarpaulins and their reinforcement. This should be planned before the tarpaulins are purchased, to insure against waste on the one hand and ill-fitting protection on the other. A little added investment in reinforcing pays large dividends when the winds are tugging at the tarps. Where salamanders are in use, a special watchman directly responsible to the job superintendent, is assigned to check the tarpaulins. He reports any tears and these are repaired immediately before the enclosures become a total loss.

Rubber-Tired Equipment

The adoption of rubber-tired wheelbarrows and concrete buggies has resulted in a great variety of benefits. The increased ease of handling such equipment has enabled laborers to carry considerably larger loads with less wear and tear than was always experienced with iron wheel equipment.

Mounting of wheels on ball bearings has also speeded up such handling, so that several factors work toward a reduction of the labor cost. Equally important, however, is the increased safety in operating rubber-tired equipment.

With rubber tires it is possible to carry materials over new floors or the floors of existing structures without any danger of damage, and this in many instances eliminates the need for erection of runways, special hoists, or carrying over long, circuitous routes. Experience has indicated that one can even negotiate earth fills with barrows and buggies of this type, so that the need for runways which have to be moved as the pour progresses is largely eliminated.

In connection with the use of pneumatic

(Continued on page 100)

BASICALLY DIFFERENT LUBRICATING OIL

REMOVES CARBON; has STRONGER NATURAL FILM

LION **Naturalube**

MOTOR OIL AND DIESEL ENGINE OIL

NEW TYPE OILS CONSERVE POWER AND SAVE FUEL BY REMOVING HARD CARBON; STRONGER NATURAL PROTECTIVE FILMS SAVE WEAR

Lion Naturalube is not "just another" oil. There are good reasons why Lion Naturalube out-performs conventional type oils.

Lion Naturalube's basically different characteristics: The ability to gradually remove hard carbon deposits from pistons, rings, valves and spark plugs and a stronger natural film assure better engine operation —fewer overhauls, lower fuel costs.

Service records on internal combustion engines of many types definitely prove that Lion Naturalube keeps rings and valves clean of hard carbon and free to function properly—that Lion Naturalube's stronger oil-film is a trustworthy guard against excessive friction-wear—that Lion Naturalube is achieving new standards of engine lubrication by conserving power . . . . cutting fuel costs . . . . saving wear.

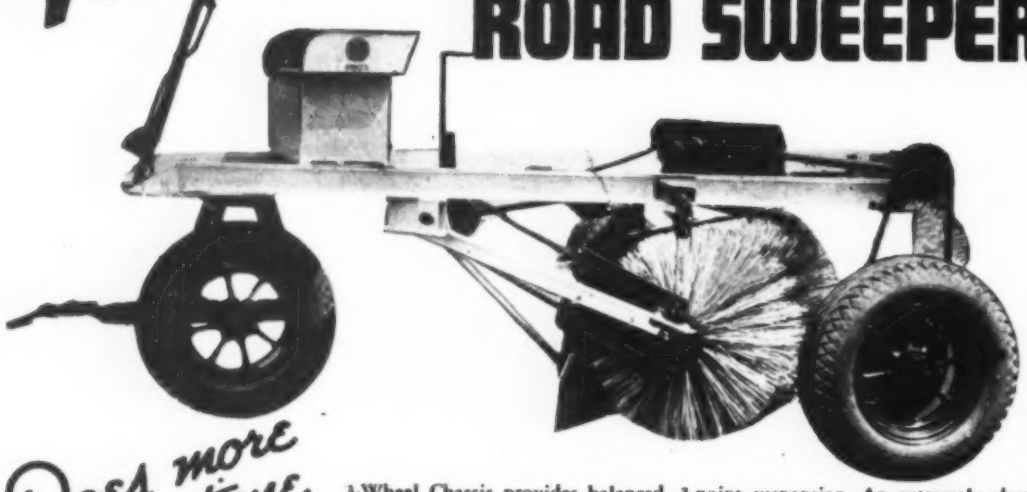
Take advantage of these money-saving features of Lion Naturalube Motor Oil and Lion Naturalube Diesel Engine Oil. See for yourself how Lion Naturalube conserves power—saves fuel—saves wear.

For visible and understandable proof of Naturalube's money-saving properties and details of money-back guarantee, phone the nearest Lion Naturalube dealer or write Lion Oil Refining Company, El Dorado, Arkansas.

LION OIL REFINING CO
EL DORADO ARKANSAS

LION PETROLEUM PRODUCTS

NEW! Reliance 3-WHEEL pneumatic tire ROAD SWEEPER



Does more in less time for less money!

3-Wheel Chassis provides balanced, 3-point suspension. An extremely short turning radius, makes unit exceptionally easy to handle and steer. A new method of raising and lowering gives quick, easy positive control of broom. The frame is all steel construction . . . eliminates a considerable amount of unnecessary weight. The machine is simple, foolproof, durable and costs less to maintain. Send for Catalogs 10 and 28 . . . for complete information about the RELIANCE line of Road Building, Maintenance and Quarry Equipment.

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y., U.S.A.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

They're Safer and Stronger!

Simplex Trench Braces are practically wear-proof and last longer because they are made of drop-forged steel instead of malleable iron.

They cut costs on construction jobs and protect men, materials and equipment by preventing cave-ins and slides. They are quickly screwed into place and "stay put". Wing nuts have ball ends for safety — another exclusive Simplex feature. Made in 14 sizes; 6 sizes without pipes.

Other Simplex Construction Jacks include Timber Braces, Tunnel Form Jacks, Shoring Jacks, Screw Jacks, Automatic Raising and Lowering and Trip Jacks, Pipe Pushing Jacks; "Util-A-Tool", the tool of a thousand uses for pulling, pushing, lifting, clamping and wheel pulling; and other Jacks for every construction requirement.

Your supply house will give you prices and details on the Simplex Line.

TEMPLETON, KENLEY & CO.
CHICAGO, ILLINOIS
Better, Safer Construction Jacks Since 1899

SIMPLEX
GOLD MEDAL AWARD SAFETY JACKS

(Continued from page 98)

tires on construction equipment, it is wise to provide vulcanizing facilities on the job so that lost time and tire-repair expense can be held to a minimum.

One maintenance factor of particular importance is paint. Liberal use of protective coatings not only prevents deterioration by rust and rot, but the distinctive colorings employed provide positive identification of tools and tool boxes, which is imperative if there is more than one contractor on the job.

Equipment maintenance in the field has a value which is in direct proportion to the duration of the construction period or the interval between trips back to the central tool yard. Frequently tools can be forwarded direct from one job to another in the same general vicinity at a considerable saving in transportation expense, and in such cases the condition in which the tools have been maintained is a deciding factor.

Tool Charges

In setting up tool charges, it should be recognized that, while a builder cannot be expected to bear the expense of construction equipment as part of his overhead, such charges must be calculated on a systematic cost basis, and should not be looked upon as a source of profit. While it is sometimes customary to charge the entire cost of miscellaneous small tools to the job and credit such tools as are turned back on completion of the project, at a depreciated value, this practice is not conducive to the close cost control which owners have a right to expect. After careful analysis of the miscellaneous small tool expense on more than a thousand jobs of various types and sizes, our organization determined the average cost of such tools to be a small fractional percentage of the total job cost, and billings are now based upon these findings. A substantial amount of paper work is thus eliminated, since the only records required on these tools are the requisition and transfer sheets.

Standard billing practice on electric hand saws, drills, sanders and other small power tools; concrete vibrators, finishing machines and other concrete equipment; chain hoists, etc., is on a rental basis, with a fixed percentage of the purchase price charged per week, as indicated by the probable useful efficient life of the tool. Where such equipment is used continuously on a long-term job, the aggregate rental for the period is restricted to a set maximum of the original tool cost — generally 75 per cent.

The builder who has a good consistent volume of business enjoys a natural advantage when it comes to construction equipment. He is in a position to make steady use of it and wear it out before obsolescence overtakes it. Thus he is in a position to keep his equipment up-to-date and to spread the cost of such tools more equitably. He does not have to forego purchase of newer and more efficient units because of a frozen investment in outmoded tools.

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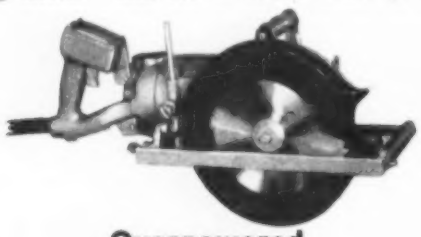

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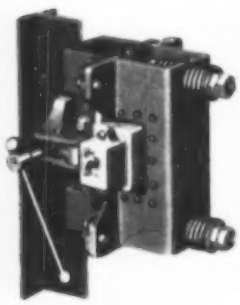
With tilting bases for bevel cuts. Also with abrasive discs for tile, etc.



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Or Ask Your Equipment Distributor

JACKSONVILLE LOW RENT HOUSING

(Continued from page 45)

soil. The walls are built of 4x8x16-in. precast hollow concrete units produced by the concrete block plant of R. T. Gordon, Jacksonville, using lightweight Superock expanded slag aggregate which reduces the weight of the blocks to less than 15 lb. apiece. Compressive strength of the units, based on gross bearing area, including core holes, averaged better than 900 lb. per square inch at 28 days.

Floors of the buildings consist of reinforced-concrete slabs of 3½-in. average

SMALL ELECTRIC TABLE SAW cuts lumber and metal base for walls and partitions.

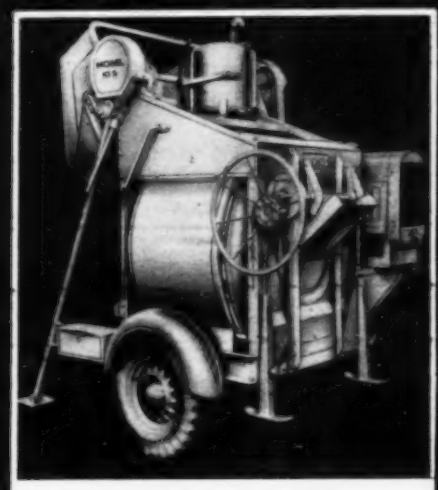
thickness supported by the masonry exterior walls and by interior framing of reinforced-concrete columns and girders. All buildings have a uniform depth, front to rear, of 23½ ft., outside to outside of masonry walls. Bolted timber roof trusses set at 2-ft. centers are supported on wood plates anchored to the tops of the masonry walls. Roofing consists of Ludovici interlocking tile laid on top of two thicknesses of 15-lb. felt, with a mopping of asphalt between the layers, over the roof sheathing.

Interior partitions between living units are 4-in. hollow tile, plastered. Other partitions are 2-in. solid plaster on metal lath. Inner surfaces of exterior walls were given a cement coat which was damp-proofed before the brown coat of a two-coat plaster job was applied. On the outside, the masonry received two applications of portland cement paint, a brush coat followed by a spray coat.

Concrete — Concrete requirements, involving 3,300 cu. yd. in foundations and superstructures and more than 5,000 sq. yd. of street paving, were supplied by truck mixers from a commercial plant. For placing practically all the concrete, the contractor used a 1-yd. hopper-type bucket handled by a crawler crane. Structural concrete was vibrated internally with a flexible-shaft vibrator driven by a gasoline engine.

Stepping Stones — Private walks approaching the apartments required a total

It's a SPEEDLINE



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THE THOMAS LAUGHLIN COMPANY
PORTLAND · MAINE

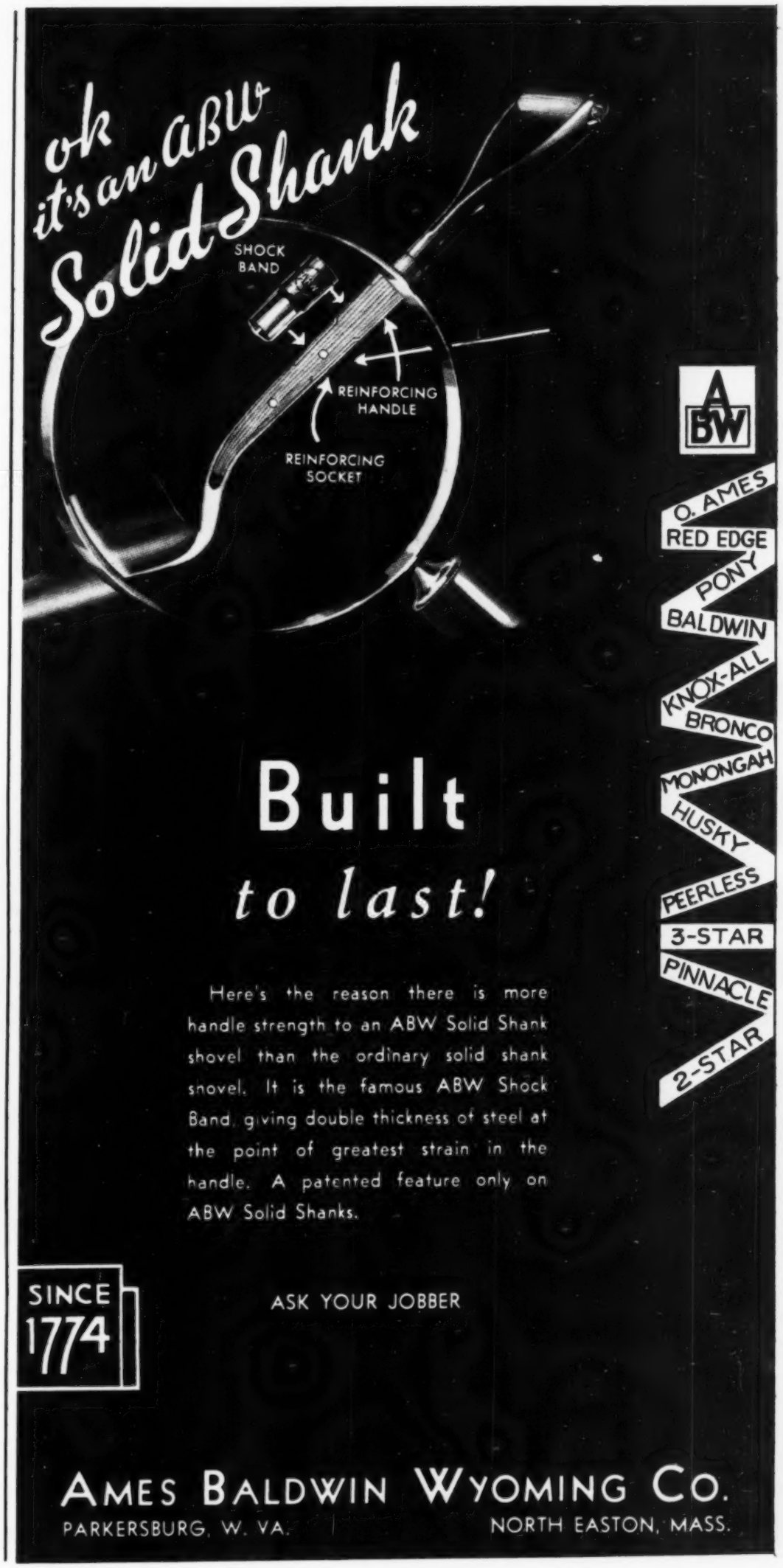
of 6,000 stepping stones, 2 ft. square by 2 in. thick. These units were cast in flat-bed molds on the job. Truck mixers delivered concrete directly to the molds. A small crew of men struck off the material in the forms and used an internal vibrator to assure consolidation. Utilizing two flat beds with forms for casting a total of 200 units, the contractor was able to produce 1,000 stepping stones in a 5-day week.

Roof Trusses—To support almost 5,000 lin. ft. of pitched roof on the 40 buildings, the job required about 2,500 roof trusses (of uniform span) fabricated at a small yard on the site. A turret-type radial saw precut all lumber to proper dimensions and miters, and two three-man crews assembled, drilled and bolted 75 to 100 trusses a day on two bench templets. The trusses were set in advance on the ground alongside the buildings and were erected at the rate of more than 80 units an hour by a small crew with a crawler crane. As an example of the erection speed, this crew was observed to set 400 trusses in less than 5 hr.

Working Force—A typical construction force at work on the project in April comprised 365 men—33 administrative, 148 skilled, 43 semi-skilled and 141 unskilled. Of the men represented in this breakdown, the general contractor employed 20 administrative, 87 skilled, 14 semi-skilled, and 89 unskilled, a total of 210. Wage rates ranged from $1.25 per hour for ironworkers, plumbers and electricians to 30c. minimum for common labor.

Administration — All activities of the Housing Authority of Jacksonville, Fla., are coordinated under Ray O. Edwards, executive director. The Brentwood Park project was designed by Six Associated Architects, Jacksonville, with Mellen C. Greeley as chief architect. For the U. S. Housing Authority, Perry McKee Teeple is construction adviser on the project. H. V. Appen, general superintendent, is in charge of the job for the J. A. Jones Construction Co., Charlotte, N. C., general contractor.

FIRST COAT OF PORTLAND CEMENT PAINT is applied to outside surface of masonry walls with brush to assure filling of pores before second coat is sprayed on wall.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HOW TO OPERATE PORTABLE ELECTRIC TOOLS *Safely*

(Continued from page 47)

Grinders, sanders, buffers, wire brushes, and other portable tools which produce sparks or flying particles can be operated safely only if the operators are equipped with eye protectors.

Electrical Hazards

Special hazard No. 1 of portable tools is electricity. Electricity follows certain well-defined rules, and we have got to play with it according to its own rules. The portable tool manufacturers see to it that the tools are built in accordance with these rules. There is, however, one point which cannot be taken care of in advance by the maker, and it is the grounding of the non-current carrying metal parts of the tool.

Dangers of 110 V.—The National Electrical Code recommends that the frames of portable motors which operate between 50 and 150 v. be grounded when they are operated in hazardous locations. In practice this means that a portable motor should be grounded unless it is dead certain that it will never be used in a dangerous place. If the operator can come in contact with a wet or damp floor, or with grounded surfaces such as metal frames of other machines, or with plumbing fixtures or metal walls and floors, then a ground connection to the motor frame is urgently necessary. Most portable electric tools are operated on 110-v. circuits, either a.c. or d.c., although some manufacturers are prepared to furnish them with 220-v. motors if specified. It should be emphasized that 110-v. current is far from harmless; too many electrocutions occur every year on 110-v. circuits. Even if your uncle, who is an electrician, pooh-pooh's the idea of 110 v. hurting anyone, don't listen to him. He doesn't know what he is talking about, and we do.

Ground Wires

The necessity for grounding portable motors is recognized by most of the tool manufacturers who provide three-wire power cables with their equipment as a matter of course. Two wires carry the current and the third, which breaks out of the insulation just before the connecting plug, is intended to be connected to ground. It is possible also to use three-wire cables ending in a three-way polarized plug, one prong of which is the ground, but it is necessary then to have three-way outlets with the appropriate grounding connections. If the portable motors are run from circuits which require, as some single-phase and all three-phase circuits do, three wires to bring the power to the motor, then a fourth wire should be carried in the power cable to serve as ground connection. In this event a four-way polarized plug may be used—one prong again connecting to the ground wire in the service outlets.

Portable motors not already equipped with ground wires should be grounded with a separate insulated wire of copper of a size sufficient to carry current up to the capacity of the fuse or other cut-out in the circuit. For circuits protected by a 15-amp. fuse a No. 18 copper wire is recommended by the National Electrical Code. A 30-amp. fuse requires a No. 14 copper wire. The code suggests that the insulation of ground wires be colored green for convenience in identifying them. The ground wire should end in a spring clip, and anyone using an electric tool should take thought for the morrow by connecting the clip to a grounded metal conduit or other ground.

Safety Switches

Get portable electric tools with safety switches. The general idea of the safety switch is that the motor can run only while the switch is held in the closed position by the operator. Some of the types are the "trigger" switch, the "grip" switch and the "paddle" switch. Usually, there is a locking pin with which the switch can be held closed for a special operation where the safety feature is not needed. These names refer to the shape and location of the switch, but all of them are alike in that it is necessary to hold them closed in order to operate the tool. "Trigger" switches always should be located on the inside of the handle or in some similar protected position so that the switch cannot be accidentally closed by contact with some other object.

The plunger type safety switch is particularly adapted for use on sanders, polishers and other portable tools which are usually operated continuously when in use. Under such circumstances a switch which has to be held closed all the time comes to be rather tiresome for the operator. The real hazard in this kind of operation lies in the accidental starting of the tool, and the plunger switch is designed to prevent this. The plunger, which actuates the electric contacts, is set in a small cup-shaped depression. Only when the plunger is fully depressed in the cup by the operator's finger can the motor run. If the tool is accidentally rolled over on to the switch or the switch is knocked against a

(Continued on page 106)

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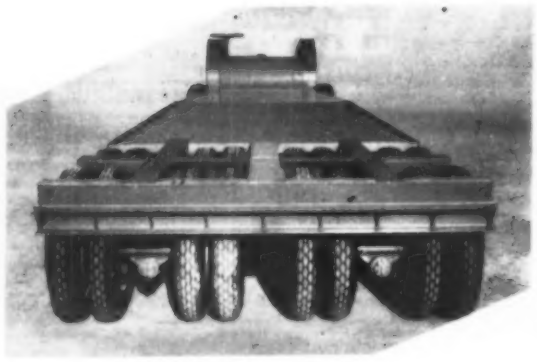

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(Continued from page 104)

wall, it will not be fully depressed to the bottom of the cup and so cannot start the motor.

Watch Your Step

Special hazard No. 2 of portable electric tools, handling the tool itself, probably causes more accidents than all the other hazards together. Precautions should be taken to prevent falls in handling these tools. First, make sure the footing is good, that the feet are well braced, and that the flooring is substantial. Second, keep a good firm grip on the body of the tool. Third, get a tool with a safety switch which will be almost automatically released if anything goes wrong. Fourth (this one seems simple, but it causes a lot of accidents), don't trip over the electric cable, particularly if the work is being done at an elevation.

Since much of the hazard in the use of portable tools lies in the handling of the tool itself, this hazard can be minimized by the various devices for supporting the tool. Sometimes drills or screwdrivers are mounted in special stands which, in effect, convert them into stationary drill presses or screwdrivers. If the tool is to be used regularly in a drill stand, it would be better to get a stationary drill press in the first place; but if work occasionally occurs which can be done better on a stationary machine than with a portable tool, then it is better to mount the portable tool in a stand than to try to do the work while holding the tool.

Good Machine Practice

Most of the safe practices that apply to any machine apply also to portable electric tools. For instance, it is good safety policy to get well designed and carefully constructed tools initially, even though they may cost a little more. Point-of-operation guards should be purchased along with the tool from the maker, since the guards provided by the maker are nearly always superior to guards constructed later as an afterthought. Common sense dictates that tools should be inspected at regular intervals, oiled and cleaned and repaired when necessary. And, of course, the right tool of the correct size and speed should be selected for a given job. It is, perhaps, hardly necessary to point out that operators of portable tools should be fully instructed in the safe operation of the tool and in the work to be done.—*(Condensed from an article in American Mutual Magazine.)*

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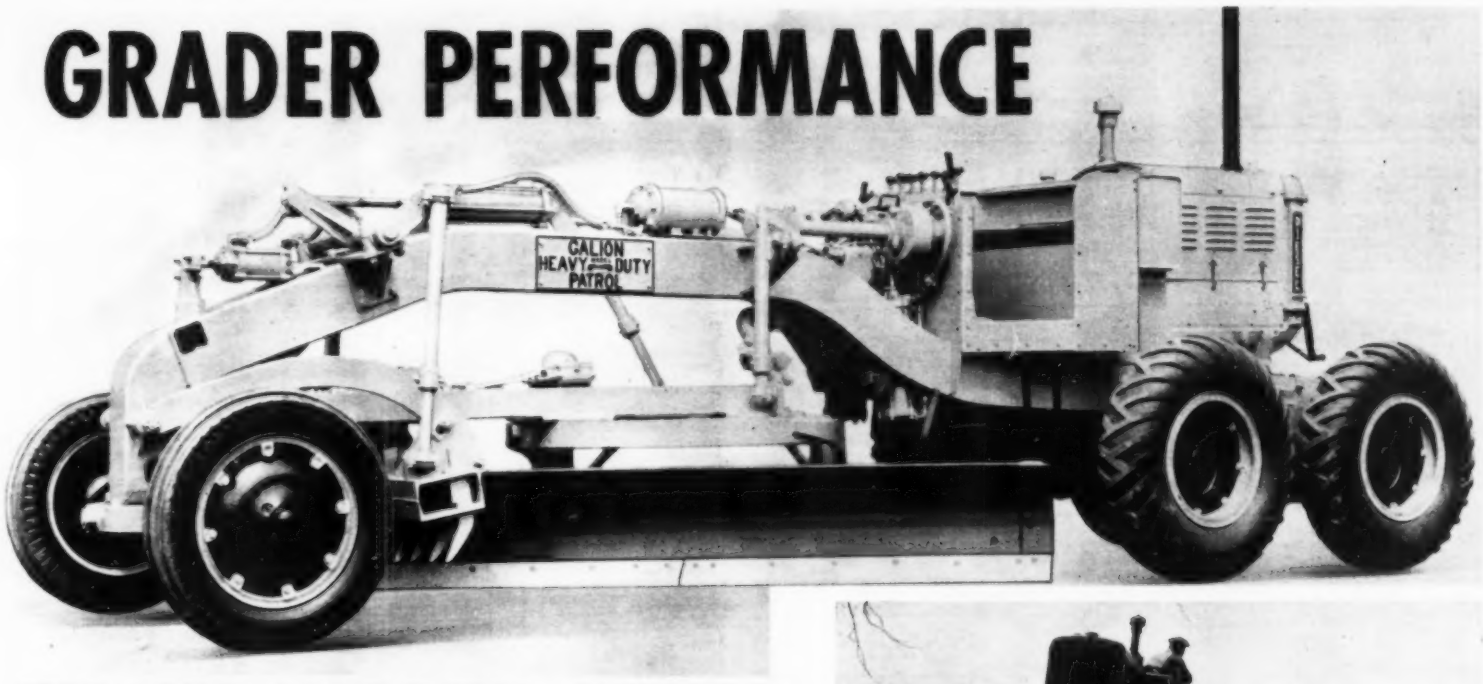

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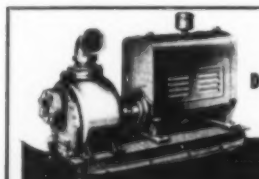

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Of Construction Methods published Monthly at New York, N. Y., for October 1, 1939.

State of New York
County of New York ss

Before me, a Notary Public in and for the State and county aforesaid, personally appeared D. C. McGraw, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Construction Methods, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, N. Y. C. Editor, Robert K. Tomlin, 330 West 42nd Street, N. Y. C. Managing Editor, None. Business Managers, Albert E. Paxton, 330 West 42nd Street, N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 330 West 42nd St., N. Y. C. Stockholders of which are: James H. McGraw, 330 West 42nd St., N. Y. C. James H. McGraw, Jr., 330 West 42nd St., N. Y. C. James H. McGraw, James H. McGraw, Jr., & Curtis W. McGraw, 330 West 42nd St., N. Y. C. Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, 330 West 42nd St., N. Y. C. Curtis W. McGraw, 330 West 42nd St., N. Y. C. Donald C. McGraw, 330 West 42nd St., N. Y. C. Anne Hugus Britton, 330 West 42nd St., N. Y. C. Mildred W. McGraw, Madison, N. J. Grace W. Mehren, 73 No. Country Club Drive, Phoenix, Ariz. J. Malcolm Muir & Guaranty Trust Co. of New York, Trustees for Lida Kelly Muir, 140 Broadway, N. Y. C. F. S. Weatherby, 271 Clinton Road, Brookline, Mass.

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

D. C. McGRAW, Secretary
McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 25th day of September, 1939.
(Seal) H. E. BEIRNE,
Notary Public, Nassau County, Clk's No. 84, N. Y. Clk's N. 98, Reg. No. 0-B-90.
(My Commission expires March 30, 1940.)

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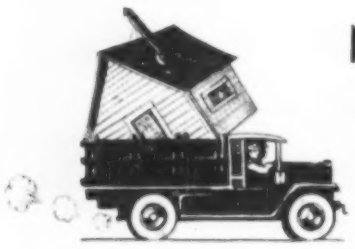

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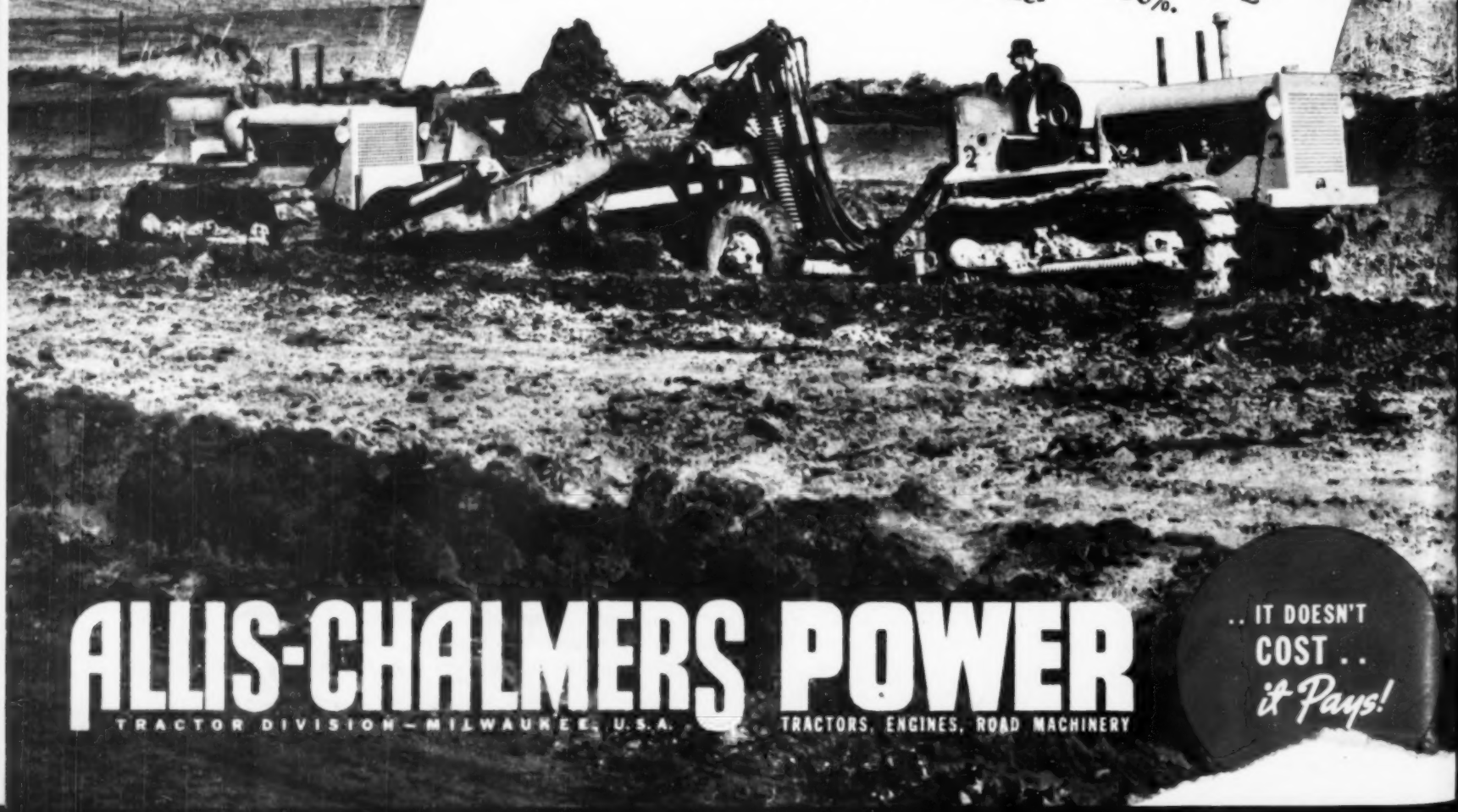

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